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QUEENSLAND AGRICULTURAL JOURNAL

VOL. XXII. DECEMBER, 1924. PART 6.

Event and Comment.

The Current Issue.

Readers will find the December Journal a very informative number. Interesting results of crop experiments and fertiliser trials in the Central and Northern districts are supplied, respectively, by Mr. C. S. Clydesdale and Mr. N. A. R. Pollock. The progress of the Departmental Wool Branch and its successful operation of a scheme for handling small farmers' clips are described interestingly by Mr. W. G. Brown. Cultural notes on the Sweet Potato are contributed by the Agricultural Branch; also a note on the Poultry Tick by Mr. Rumball. A notable contribution is an account of profitable banana-growing at Kin Kin, on the North Coast, from the pen of Mr. C. N. Freeman, who has achieved much success in the industry. Mr. C. T. White discusses a poisonous plant common in our coastal rain forests, and known as the Native Bryony. This month Mr. Shelton's main topic is the merits of some root crops as food for pigs. Reprinted matter includes some valuable notes on the food value of dried whey solids, and a paper on rural hygiene. The activities of the Bureau of Sugar Experiment Stations are well covered, and a report on Fruit Fly Investigations helps to sustain interest in Mr. Hubert Jarvis's notable work on the Granite Belt.

Our Northern Climate.

"There is evidence that the old bogey regarding the unsuitability of North Queensland as a place for white people to live in is still being used on the other side of the world," said the Acting Premier (Hon. W. N. Gillies) in the course of a recent Press interview. Some immigrants of a quota that arrived in Brisbane recently expressed their disappointment when they found that their destination was to be North Queensland. Several of these settlers have since written to friends expressing their surprise and approval of the Northern climate. "My attention having been called to certain adverse reports respecting the conditions alleged to obtain in North Queensland, I have cabled to the Agent-General asking him to take action to combat and controvert them, and to call special attention to the more striking passages in a report by the Director of the Australian Institute of Tropical Medicine at Townsville (Dr. R. W. Cilento), which disproves these allegations." Mr. Gillies went on to say that Dr. Cilento's report concerning the climatic conditions of North Queensland, as they affected the health and virility of the people, was a valuable one, and 40,000

copies of it were printed by the Government; a large number was circulated at the British Empire Exhibition at Wembley Park, and many were distributed through the Agent-General's office. It is only necessary to study the conclusions of this eminent authority and to note the low death-rate and infantile mortality figures, as compared with those of any other country in the world, to realise how ridiculous is the assumption that North Queensland is not a fit place of residence for white people. Dr. Cilento points out that, in respect to the influence of climate on the health of residents in the tropics of Australia, a careful scientific inquiry had failed to elicit any facts showing evil climatic effects on public health. He adds that the majority of those violently opposed to the colonisation of the North are either people who have never been there, or those whose conservatism makes it impossible for them to form an unbiassed opinion. All scientific inquiry goes to prove that there is no obstacle to the white race working, living, thriving, and multiplying in the Australian tropics. Mr. Gillies's recent tour through the North during one of the hottest months in the year confirmed him in his belief that North Queensland is not only suitable in every way for the homes of white people, but will ultimately carry a white population at least equal to the present population of the Commonwealth.

The Cotton Crop.

The excellent effect which proper spacing and good cultivating has on the development of the fruiting system of cotton plants in comparison with the considerably lesser development of plants not so well served was strikingly evident in the course of a recent tour of inspection through the Central Queensland cotton areas by the Departmental Cotton Specialist, Mr. W. G. Wells. In general, the condition of the planted crops throughout the areas visited was good. Many were in excellent condition and at least a month ahead in development of plants at the corresponding period of last season. Some crops were observed where the thinning and cultivating had not been done in time, and thus the growth of the plants had been retarded. Such instances occurred often where the areas were 20 acres or more in extent, and it is believed that if the growers who are also dairying would confine themselves to acreages which they are able to handle efficiently, there would be a marked improvement in the standard of cotton growing. This is shown by the results being obtained this season by the Durango growers, most of whom have restricted their areas to acreages they could properly care for.

In nearly every district a large number of crops was seen which had been thinned out at the proper time and well cultivated. The plants in such fields were well loaded with squares, and in the more advanced crops the flowering was becoming general over the whole of the field. The effect of proper spacing and cultivating on the development of the fruiting system of a plant was clearly shown when plants in such fields were compared with plants in fields in which the cultivation had been poor and the thinning either delayed for a considerable time or not done. The properly grown plants were producing fruiting branches on the fifth or sixth joint above the seed leaves, which were well laden with squares (flower buds) and in many cases young bolls as well, whereas the plants which had been improperly grown were only just commencing to produce a few small fruiting branches near the tops of the plant. The early development of the crop of squares and bolls is believed to be of the utmost value. Even if some of the lower bolls are lost by excessive moisture caused by a wet season in January or February, it is expected that the early setting of the crop will cause the plant to toughen-up during the hot spell prevailing in most parts of the cotton belt to such an extent that the plant will not so quickly respond to any heavy rains falling later on as to produce such a rank growth, and a severe loss of crop, as was experienced over many parts of the cotton areas of last season.

A Ratoon Problem.

One very noticeable feature observed by Mr. Wells in nearly every cotton area where ratoon cotton was being grown on old cultivated land, was the difficulty that the growers were having in keeping the ratoon crops sufficiently free from grass and weeds to allow of the proper amount of cultivation. Especially was this so in cases where crops of over 20 acres were being grown by one individual. Owing to the branches of the ratooned bushes spreading away from the plant in a nearly horizontal position, they were covering such a wide area that it was impossible to cultivate with a machine without inflicting serious damage. The heavy crop of summer grass and pig weed which had developed following the period of rainy weather some weeks back therefore had to be chipped out by hand. Many fields of the ratoon crop appeared to have been either abandoned, or had been reduced to an area which the grower could cope with. Where the chipping and cultivating had been delayed the plants were showing distinct signs of suffering from lack of moisture—the leaves wilting badly in the forenoon and the bolls commencing to show evidence of being stunted in their development.

Bureau of Sugar Experiment Stations.

CANE PEST COMBAT AND CONTROL.

ENTOMOLOGIST'S REPORT.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following reports from the Entomologist at Meringa, near Cairns (Mr. E. Jarvis):—

Results of Past Experimentation.

Reviewing the cane-grub situation by the light of comprehensive data obtained during research work continued for the last ten years, we are now in a position to state that, in the opinion of the writer, our chief offender, the well-known grey-back cockchafer is best controlled during its larval and imago stages of development.

As a result of careful consideration of numerous methods of combating the various life-cycle phases of this pest, I may say that those applicable to the grub condition have proved the most promising up to the present.

Such control methods can, if desired, be practised during a period of from two to three months, while the larvæ are passing through their first and second instars, before they have been able to damage the cane; moreover, the grower has the satisfaction of knowing that destruction of the grubs attacking any particular crop in December and January (after disappearance of the beetles) means that any cane so treated is certain to yield maximum results, since no further infestation of grubs can possibly occur until the following year.

Commenting on the various remedial measures outlined in a previous monthly report for March, 1915 (''Australian Sugar Journal, Vol. VII., pp. 140-41), it may be stated that while one or two of these still offer a wide field for future research, the following stand out as being well within reach of our canegrowers.

(3) Collecting grubs by hand wherever practicable, both from behind the plough and from under trash in wet weather.

(4) Fumigation of the soil with a gas deadly to animal life, but having, if possible, a stimulating effect on vegetation.

(8) Encouraging vigorous root development and conditions favourable to conservation of moisture by judicious manuring and thorough cultivation.

(10) Maintaining the soil in a friable state, and free from weeds throughout the growing season.

It is encouraging to be able to announce that investigations carried out during the last couple of years regarding the possibilities of measure No. 4 have yielded positive results, both in laboratory and field experimentation, and might now be said to have arrived at a focus, as it were; fumigation of the grubs during the first and second instars having been accorded chief place.

Carbon bisulphide has been used for many years in our Northern canefields, and when applied intelligently and at the right time good results appear to have followed. Its use, however, instead of becoming more general has decreased of late, owing to various causes which need not be discussed here. In some other sugar-growing countries, Porto Rico for example, where it was used in 1918 for combating grubs of *Phyllophaga* and *Phytalus*, it proved disappointing, and when doses exceeding 12.5 c.c. were employed was found to injure the cane, ''stunting its growth, and often killing the plant.''

Up to the present our experiments with soil fumigants have shown that para-dichlor. is entitled to take first place as a controlling agent against the grubs of our principal cane-beetle.

Calcium cyanide is likely to prove equally effective, laboratory tests on grubs in cages having given startling results. No field trials have yet been made, however, although it is hoped to establish experiment plots in this connection during the coming season.

Natural Control Checking Increase of Cane-beetles.

The past year has proved a lucrative one for our Northern canegrowers, insect pests having, on the whole, given little or no trouble.

This, as stated in my Annual Report for 1923-24 (the following extract from which may interest cane farmers) is owing mainly to the normal activities of our grey-back having been restricted by adverse climatic conditions experienced in the Cairns and Babinda districts during the last two years.

Such check was due in both seasons to the occurrence of dry weather throughout the period September to January, whilst this insect was in its pupal and imago stages. These beetles usually emerge from the pupæ in October, remaining, however, in their subterranean pupal-chambers for three or four weeks, until thunder showers —which generally arrive about the middle of November—have moistened the hard dry soil sufficiently to enable them to tunnel to the surface.

Unless rain falls before the first or second week in December countless numbers must inevitably perish through inability to reach the feeding-trees. In 1922 the total rainfall for Cairns district during a period of five months—September to January—was 7.65 in., while the average precipitation for that period was 34.0 in. To make matters worse for the imprisoned beetles 10 points only were recorded in November instead of 413 points, the average for that month; and during December of the same year 197 points, as against the average of 919 points.

These two months, which undoubtedly cover the most critical period in the life-cycle of this pest, should have yielded collectively a precipitation of 13.32 in. instead of only 2.07 in.

In 1923, although the situation was a little easier, abnormally dry conditions again operated as an additional check on the numerical increase of this cockchafer, before it could recover from the set-back experienced the preceding year. The rainfall was 15.73 in. collectively for the similar period of five months (September to January) as against the average of 33.42 in.

During November of 1923, however, which may be considered one of the most critical months for this species, only 60 points were recorded instead of the average of 403 points; while, to make matters worse, the beetles had appeared in the pupal chambers during September owing to grubs having assumed the pupal state earlier than usual. Thus a want of sufficient rain in November proved a far greater check on the beetles than would have been the case had pupation of the grubs occurred at the usual time of year.

It is well to bear in mind that when normal seasons again prevail, there is every likelihood of this destructive cane-beetle manifesting its usual activity, more particularly in those districts where practical control measures, such as collecting the grubs and beetles, have been altogether abandoned.

21st November, 1924.

Experiment Plots at Woree.

Through the courtesy of Mr. E. C. Earl, these experiment plots were allowed to stand for about a fortnight after the surrounding cane in the paddock had been harvested.

When finally cut on 18th September, the crop being then thirteen months old, it was loaded on different trucks in order that cane from the treated and check plots might be weighed separately at the Hambledon Mill.

As a result of figures supplied by the Colonial Sugar Refining Company, it may interest growers to learn that the area (one-eighth acre), fumigated with para-dichlor., yielded 3·410 tons of cane, equal to 27·280 tons per acre; while the grub-affected cane from the check plot of similar area weighed 1·755 tons, representing 14·032 tons per acre.

Thus we find from the above figures that a gain of an additional 13·428 tons of cane per acre was secured as a direct result of this treatment.

It must not be forgotten that increased tonnage is not the only benefit one derives from a control measure of this nature, since destruction of the grubs under plant cane means also the development of healthy ratoons for the following season.

A large percentage of grub-eaten plants on our check plot at Woree were practically out of the ground, holding merely by two or three roots, which, although able in some cases to keep such sticks alive, could not supply sufficient nourishment for any additional growth, or prevent the gradual drying up of affected canes.

Degrees of Grub-Infestation.

Fortunately, the grubs in this paddock at Woree last season were confined to large patches of varying extent, such infestation causing some of the cane to collapse in places, but not being severe enough to totally destroy it. These conditions prevailed in the vicinity of our experiment plots.

During really bad seasons grubs will sometimes kill half-grown stools of cane by literally eating them out of the ground.

In such cases no amount of rain can keep the plants alive, and in a few days every leaf is brown and dead. This calamitous state of things happens occasionally to Badila growing on light friable soils.

By using para-dichlor. it should be possible to grow good crops of Badila where at present only uncertain crops of D. 1135 are being obtained.

Controlling Grubs by Means of Cultural Operations.

The influence of cultivation in connection with cane-grub control has been briefly touched on from time to time in my early reports, although up to the present the various field operations calculated to reduce grub-infestation have not been enumerated collectively.

It may be well, therefore, to mention a few common-sense means of combating this pest during its early larval condition, when occurring on small areas known from past experience to be liable to infestation.

(1) Try to have the soil between cane rows loosened up and free from weeds by the time grey-backs appear on the wing, maintaining such cultural conditions for at least one month from date of emergence of the beetles.

By doing this one takes advantage of a habit common to cockchafers of ovipositing by preference in undisturbed ground, the hard surface of which affords a kind of fulcrum, enabling the beetle to easily maintain its correct position while digging-in. A surface consisting of loose particles is not so readily entered, the soil naturally tending to impede progress of the insect by continually falling into its tunnel during excavation.

(2) Work the soil close to cane rows while grubs are in the first instar, and quite small. This period, which commences about a month after the first appearance of the beetles, occupies from five to six weeks.

Advantage may thus be taken of the habit common to first-stage grubs of our grey-back of feeding close to the surface within 3 in. to 6 in. of cane stools. This position brings them within reach of agricultural implements, and by stirring a strip of soil about 12 in. wide, as close to the stools as one can go with safety many of these grubs will be killed, since those sustaining minor injuries due to compression of the soil, jars, abrasions, &c., usually die a few days later. Planet Junior implements are suitable for this work, and it would pay to run through a small patch several times in the manner described at intervals of a few days.

(3) Encourage vigorous root development and conditions favourable to conservation of moisture by judicious manuring and thorough cultivation.

Such field work not only ensures an increased yield of cane but has a decided influence also on any third-stage grubs that may be present during February at a time when cane leaves have met between the rows.

Stools surrounded during this period by a dense mat of fibrous feeding-roots—such as one finds near the surface in well-worked and manured soils rich in humus—suffer less damage as a rule from third-stage grubs than poorly-cultivated cane.

These upper roots are usually the first to be devoured, and unless an infestation happens to be severe vigorous stools in rich soil can make additional roots almost fast enough to take the place of those being eaten. Grubs are very fond of these tender fibrous roots, and generally finish every one before attacking those lower down, which supply moisture to the plant, and being stout and cord-like enable the stools to get a firm grip of the ground.

I have previously pointed out (Bulletin No. 17, p. 57) that larvæ of our grey-back are not humus-feeders to the extent often supposed by growers and others, but subsist very largely on living vegetable tissue; hence the habit noticed above, common to its first-stage grubs, of feeding near the surface on young fibrous cane roots.

Humus, however, while helping to keep the top soil in good mechanical condition for retaining moisture during hot weather, has an influence, indirectly, upon grub activity, since it tends to promote an abundant development of surface feeding-roots.

Keep fallow land reserved for early plant cane free from weeds during December to January while cockchafer beetles are engaged in egg-laying.

A luxuriant growth of vegetation between the rows is strongly attractive to egg-laden females of *Albohirtum* and *frenchi*, which usually oviposit during December and January. Grubs of the grey-back attain full growth in the space of about six months (January to June), pupating as a rule from July to September.

Those of *frenchi* on the other hand remain in the larval stage for nearly a year longer, both second and third stage grubs of this species being procurable during winter months; damage to cane, however, occurring every second year when the majority of its larvæ are in the third instar and fully grown. This cockchafer oviposits freely on grass land or among weeds, with the result that when ploughing for an early crop the grubs from eggs laid in such situations being about five months old and still small, are often overlooked or allowed to remain in the soil. As a matter of fact, however, these young larvæ have still about a year to pass before pupating, during which time they are able to cause appreciable injury; moreover, after such infested land has been planted and the weeds destroyed, they are necessarily obliged to subsist almost entirely on roots of the cane.

FIELD REPORTS.

The Southern Field Assistant, Mr. J. C. Murray, reports under date 19th November, 1924:—

Bundaberg.

The prospect for next season in this district is promising. The young plant and ratoon cane is growing vigorously, and if the present good weather conditions hold, will need constant cultivation to keep the weed growth in check. The planting of leguminous crops for green manures is becoming more general.

Growers are doing more individual experimenting with fertilisers than hitherto. Deeper and more intensive cultivation is also being carried out.

The most important feature in cane planting is, however, being more or less neglected, and that is plant selection. Many growers will remark that the planting season is a busy one, and there is no time for a close scrutiny of the plants. The majority of farmers can now recognise disease, having been pointed out to them by officers of the Bureau, or in descriptions published in reports from time to time. However, no matter what truth it may involve, the farmers should endeavour to be more observant with regard to unhealthy stools of cane.

Cane varieties making the best showing in the Bundaberg district are Q. 813, M. 1900, H.Q. 285, H. 227, and Petit Senneville. Varieties not likely to be satisfactory in future in the Bundaberg district are, from recent observations, Black Innis, H.Q. 77, Shahjahanpur No. 10, and E.K. 1. The first two are suffering very considerably from disease. The growers are recommended to discontinue planting these varieties. B. 208 is a cane that is still growing on some farms and should be discarded. This cane is very susceptible to disease, one grower visited having at least 50 per cent. affected stools.

Taking into consideration the resistance of a variety to disease or otherwise would be a matter worthy of attention by judges of sugar-cane at the shows. Judging by c.c.s. value and the appearance of a carefully selected stool of cane is partly an error, and not in the best interests of the industry.

Several growers remarked on the shortage of cutters and chippers. There certainly appeared to be plenty of work for the hoe, as the grass and weeds were growing strongly where they were left alone for any length of time.

Mackay.

Since the beginning of the month splendid rains have fallen in this district. At present the countryside looks very promising. The young plant cane is making rapid growth. The standing crop is growing also, with a slight drop in sugar content. The farmers have had an excellent season. Since the crushing started the c.c.s. has been good and the mills have been doing highly efficient work. Cut cane is ratooning well, and there is every promise of a good yield next year. Absence of systematic green manuring is still a weak feature in farming operations. The loams that prevail in the Mackay district are for the great part deficient in humus and lose moisture very quickly as soon as dry weather sets in.

Pinnacle.

Cane varieties that are making good growth in this area are H.Q. 426, Q. 813, D. 1135, M. 1900, Seedling, and Badila. H.Q. 285 is a cane showing good growth, though as yet there is not much of this variety grown. H.Q. 426 (Clark's Seedling) is a cane that looks well at present, and is extensively grown, but farmers are advised to exercise great care in selecting plants of this variety, as it shows a considerable susceptibility to disease on some farms. Farmers are recommended to plant more Q. 813 than they are doing, excepting in places where grub infestations are likely to occur.

Recent heavy rains have caused considerable washing of cultivated soil on a number of farms that are on a slope in this area. To prevent erosion, or to check it, as much vegetable matter as possible should be worked into the soil. In addition to binding the soil, matter worked under, such as trash, cowpea, and Mauritius bean, gives the soil humus and increases the available supply of natural plant food, which is in the soil. And that is what is wanted on forest loams, such as are found in this locality. Green manuring and thorough cultivation will nearly always provide and answer to the cane farmer who puts the question to himself: "My land is running out; what shall I do with it?"

Predaceous insect pests and noxious weeds, while present, are not giving the growers much anxiety. The cane grub and wire worm are causing small losses and, while it is difficult to control the latter by mechanical means, if the farmers were to study the life cycle of the cane grub from the various papers issued by the Bureau on the subject, they could see by the excellent graphs compiled by Mr. Jarvis, the active feeding periods, and by intensive cultivation during those months do much to disturb its habitat and prevent it from manuring.

Johnstone grass and "white eye" are the more serious of the noxious weeds. The latter might be turned to some commercial value, as farmers have observed that horses are very partial to it.

Mount Martin.

The work of getting about amongst the growers was seriously handicapped by very heavy rain. The farmers are busy finishing harvesting operations, and some heavy cane was being loaded at the derrick.

A branch line starts from Glenholme and runs through this fertile district, but as there is no system of light railways, the farmers do the transporting of the cane by horse wagons. The soil in this locality is a medium quality forest loam, with about a foot of top soil, and a substrata of light loam interspersed with gravel.

The reaction of the soil is slightly acid. Whenever it is possible to do so, farmers are recommended to green manure and try liming.

Cane varieties making good growth in this locality are: Malagache, D. 1135, and N.G. 38. Clark's Seedling does not generally give good results in this area. The farmers are recommended to plant M. 1900 Seedling and H.Q. 285.

Disease (Mosaic) is showing in places in the N.G. 38. As the necessity for careful selection has been pointed out earlier in this report, there is no occasion to further stress the point.

The roads to this locality could be improved.

The Southern Field Assistant, Mr. J. C. Murray, reports under date 5th November, 1924, as follows:—

Mount Bauple.

Crushing in this area is proceeding smoothly. The c.c.s. content is fairly high, although occasionally a low test is registered. This may be due to other causes, but it is almost certain that it is due to diseased patches of cane being sent to the mill, unless, of course, the cane is immature.

Growers are doing good work in regard to their agricultural methods, although more green manuring would be beneficial.

There is a large number of varieties in this district, but the best appear to be M. 1900, Q. 813, and H.Q. 285. Other canes making a good showing are Q. 970, N.G. 64 Sport, E.K. 28, D. 1135, H.Q. 426, M. 189. A factor the growers must always keep in mind in planting cane is the particular varieties resistant to disease. A cane is really valueless if it is a variety susceptible to infectious disease. Q. 813 is resistant to Mosaic disease and "gumming," and other infectious diseases of lesser economic importance. H.Q. 285 is resistant to Mosaic, but tolerant of "gumming" and resistant to minor diseases. Q. 970 is a cane that is fairly resistant to disease. N.G. 64 Sport is a susceptible variety. E.K. 28 is a fairly resistant variety to Mosaic disease, but recent observations suggest that it is susceptible to gumming. D. 1135 is a variety that is tolerant of gumming disease, but is fairly resistant to Mosaic. It is a variety that should be gradually worked out, or most carefully selected before planting.

Root-destroying fungi were active in places where soil conditions were poor. In some instances roots were completely destroyed by this secondary attack. Growers are advised to drain and lime their soil when they note any attack of root-destroying fungi.

Speaking generally, the Mount Bauple district is looking well and the outlook is promising.

Yandina and North Arm.

Very heavy crops are growing in these districts. Growers were busy cutting their allotments at time of visiting, but it is very doubtful if the milling strength is sufficient to cope with the present crop.

Cane varieties making the best showing in these districts are H.Q.285, Q. 813, and M. 1900 Seedling. The latter requires very careful selection when planting. This variety is beginning to deteriorate in Southern Queensland, owing to careless and unconscious selection of bad sets.

Growers are advised to plant a little deeper than they are doing at present. Owing to the abundant rainfall in these districts the cane grows quickly, becomes top heavy, and falls down. It would establish a better root system in the soil if planted, say, 9 in. deep, and subsequently cultivated properly.

The reaction of the soil in these districts is acid. Judging by the colour and texture of the soils, green manures and light dressings of lime would be beneficial.

Insect pests are not causing the growers much loss in these localities. A small black beetle (*Pentoden australis*) appears to be troublesome wherever there is paspalum grass, also a grub corresponding in description to the larvæ of the grey-back beetle is causing minor losses. The growers must, however, take the question of plant selection very seriously. Farm workers should interest themselves in this matter as well as the growers, for without their co-operation it is almost impossible to keep the fields healthy.

Beenleigh.

There are five mills in this locality. The largest, belonging to Mr. Heck, is doing excellent work. Farms in the vicinity have been linked up with 6 miles of tramline. Heavy crops are being taken off, the canes making the best showing being Q. 813 and D. 1135.

Soils on the river flats are naturally rich, and farmers have maintained the fertility by crop rotation, thorough cultivation, and a minimum of burning. Heavy fires on cane lands, especially volcanic, are a distinctly bad feature, and where possible cane-cutters should not insist on so much burning. It is altogether inexcusable, say, to burn M. 1900 Seedling. It would also pay many growers much better to "work in" cane trash than destroy it.

A considerable number of stools were found affected with Mosaic. The common form this disease was taking in the Beenleigh district was, as regards the primary symptoms, a number of pale, short streaks in the normal green tissue, parallel with the midriff, not meeting, but alternate, a folding of the leaf and mottling of the rind of the cane with an unhealthy shrinking of the nodes. It is a disease easily recognised and growers should make a careful survey of their fields before planting.

Nambour and Coolum.

The crops in these districts could be described as heavy. An exceptionally open winter preceded the crushing and this factor, combined with extension of areas, has given these districts a record tonnage. If events prove that the sugar surplus can be satisfactorily dealt with, the milling accommodation must be increased in these districts. An important aspect of the question of exporting sugar is the efficiency of farming. If the tonnages per acre are increased by scientific farming and the purity of the cane juice is not interfered with by disease in the cane, the growers have no need to be unduly pessimistic as to the future. The efficiency of farming is increasing in these areas, however, and it is noticeable that growers are making more effective drains and making more use of lime and green manures.

Cane varieties making a good showing in these districts, are E.K.28, Q.813, H.Q. 285, Gingila, N.G.15, and on the higher lands, M.1900 Seedling. On the top of the hills west of Nambour the varieties Q.970, Q.1121, and Q.1098 are worth planting. D.1135 is largely grown, but is showing "gumming" disease to a considerable extent.

Very considerable progress has been made at Coolum. The farmers have overcome the drainage difficulties and the country side is developing a clean, well-cultivated appearance.

The soil down here (Coolum) has strongly acid reaction, and it is probable that lime would materially assist the farmers to improve the texture of these soils. "Gumming" disease is in evidence, especially in wet patches. This may be due to a lowered point of resistance in the cane through bad soil conditions.

ENTOMOLOGICAL HINTS.

The following remarks, unless otherwise mentioned, apply to cane land lying within a radius of about 20 miles from Meringa Experiment Station. Farmers desiring additional information regarding the control of cane pests are invited to consult the Entomologist, either by 'phone (95 Gordonvale) or letter, addressed:—"Meringa," Private Bag, Cairns.

Concerted action taken at the right time will often go far towards minimising injuries caused by our more serious cane pests, and whilst not unduly trespassing on daily activities of the cane farm, would tend to benefit growers financially.

Appearance of Small Brown Cockchafer.

The well known cane-beetle *Lepidiota frenchi* will emerge during this month in countless numbers on forest country, and from small areas of cane land where third-stage grubs of this pest proved injurious to young ratoon and plant crops in September and October, 1923.

During the present season cane will, however, be free from such attack, owing to *frenchi* having a life-cycle of two years, so that no damage need be expected until September, 1925, when third-stage grubs of this species will again be in evidence.

Although one of our serious cane-beetles, second to *albohirtum* in economic importance, this insect fortunately oviposits, as a rule, in uncultivated soil densely covered by grass or weeds, &c. Thus, it behoves growers to maintain during December and January a system of clean culture on areas devoted to cane, and more particularly on fallow land that may be reserved for early planting. Both *albohirtum* and *frenchi* lay their eggs during these months, and are strongly attracted by a luxuriant growth of vegetation between the rows, so that land in a weedy condition is almost sure to become badly grub-infested.

Treatment for Moth Borers.

Young cane shoots showing "dead hearts" (browning of the central leaves) should be cut out about 2 inches below ground level, and either burnt or crushed to destroy caterpillars of moth borers; three species of which are at present in the larval condition.

Stealing a March on the Weevil Borer.

Keep an eye on the growth of cane on river flats and areas where this borer is likely to occur, and if discovering evidence of this pest having commenced to attack the basal portions of canes, communicate at once with the Entomologist at Meringa. Tachinid fly parasites will be released by the Sugar Bureau free of charge on areas affected by this cane-borer, on the condition that growers will agree to leave about a quarter of an acre of cane sticks harbouring borer-grubs for the flies to breed in. Such cane must be left uncut for at least three months from date of liberation of the parasites, and must not be burnt.

"Greybacks" on the Wing.

As foretold last month, cane-beetles made their appearance towards the middle of November, fair numbers being noticed on feeding-trees at Highleigh and elsewhere.

Growers noticing quantities of beetles on food-plants near headlands, would do well to collect and destroy same. Such control work would prove profitable during a period of about six weeks following the date of emergence. The position near headlands of such favourite trees as native figs—(both weeping and broad-leaved varieties)—and Moreton Bay gums (*Eucalyptus tessalaris*), should be located without delay, since these food-plants usually attract many greybacks and are worth visiting daily.—EDMUND JARVIS, Entomologist.

CANE PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (3rd November, 1924) from Mr. W. Cottrell Dormer, who is investigating pests and diseases of Sugar-cane:—

Both from the point of view of Entomology and of Pathology there is room for a great deal of original investigation in the Isis areas, as pests and diseases occur here which have not been met with elsewhere.

Mount Bauple.

Diseases.—Of the more important infectious diseases of sugar-cane only one was actually observed, though others may, of course, have been present to a slight extent and in a dormant state; this disease is Mosaic and was found scattered more or less throughout. The actual damage being at present sustained from it is small where the district is taken as a whole. However, blocks here and there were seen where the damage was really appreciable. This was especially the case where the affected cane was growing in close proximity to the variety known as Shahjahanpur No. 10. As is now well known this variety has shown a marked susceptibility to Mosaic disease; not only is this the case, however, but, furthermore, Mosaic disease appears to spread more readily from it than from other canes. Now Masaic is, as far as is known, entirely dependent on insects for its transmission from plant to plant, so that the reason for this dangerous quality may be that the insects responsible for the transmission of Mosaic prefer it to other canes. Whatever be the reason, growers should be warned against growing any other varieties close to Shahjahanpur, or if for some reason a farmer is obliged to do this he should only grow a variety known to be resistant in this situation (Q. 813 is such a cane); in any case the grower should desist from further planting Shahjahanpur.

Knife cut disease was encountered on almost every farm, but the damage at present being done by it is negligible as only sticks here and there are to be found affected. This disease was found only in the variety D. 1135, which is the staple cane of the district and, so far as records show, the only cane which is subject to the disease.

At Gundiah a very acute form of root-disease was encountered. This disease is locally known as "Foot-Rot," and is probably a severe infection of *Marasmius* sp. (*sacchari?*), but as I was unable to find fructifications of any kind further investigation would be necessary to settle this point. The disease appears first to attack the lower roots in the soil and causes these to die altogether and gradually works upwards, and eventually kills practically all of the roots of the affected stem. Aerial roots are then formed by this stick which find their way into the soil to replace the diseased roots. If the weather is suitable for the development of these roots the cane will survive but will remain stunted; if, on the other hand, conditions remain suitable to the disease these new roots are also attacked, which has been the case in this instance. The fungus then makes inroads into the stick itself through the roots, so that at the base of infected sticks a brown band can be seen, where the roots have been, around each node. This band consists of the decayed tissue of the stem, is dry at this time of the year, and if scraped with a knife will crumble away very readily to a depth of about one-sixteenth of an inch. The effect of the disease on the stick is to cause it to remain badly stunted or even to kill it, and to cause it to lodge on the ground, being devoid of roots for support. I would suggest the following practices for the control of the disease:—(1) Seed selection, *i.e.*, the avoidance of infected material for planting purposes so that as little as possible of the fungus may be introduced with the plants; (2) when the cane is ploughed out, in cases like those observed at Gundiah where serious damage is being sustained, all stools should be carried off from the field thus removing the worst source of further infection; (3) rotation of crops, with plants belonging to a widely different botanical order to cane, such as cowpea and other leguminous crops—corn is too closely related to cane and often serves to carry cane disease from crop to crop. While the soil is being spelled it should be turned over as frequently as possible in order that full advantage may be taken of the sterilising influence of the sun.

Insect Pests.—The Mount Bauple district is remarkably free from insect pests, the only ones observed being the large moth borer and the minor sap-sucking insects usually found on cane. The moth borers at times do serious damage over small areas.

Isis.

Diseases.—Gumming Disease, Mosaic, Acute Root Disease, and a disease very much resembling Iliau, if not identical with it, are the more serious diseases at present showing in the Isis district.

Gumming disease was observed throughout most of the district to a greater or less extent, and more particularly in the following localities:—Horton, Doolbi, North Isis, Huxley, Hapsburg, and Cordalba. It was not seen at South Isis, but as only a very brief visit was paid to this locality it cannot for that reason be declared free from gumming. Very little actual damage is being done by the disease, but a few fields in the North Isis are being seriously affected. The variety D. 1135 is the one which is by far the most infected, but sufficient healthy cane probably remains in the

district from which to select clean plants; however, it will require concerted effort on the part of the growers to find out just where this is to be obtained. The best means of detecting gum in the field is by the leaf-symptoms of the disease. These consist of irregular dead longitudinal streaks in the leaf. The very tip of the leaf is dead, and these dead streaks continue downwards from the dead tip (though dead patches are sometimes found in the leaf away from the tip, but not usually on D. 1135). The streaks vary in length from 2 in. or 3 in. to as much as 12 in. Where there are several of these streaks the portions of the leaf lying between them are usually of a quite normal green without any tinge of yellow unless the leaf be an old one. A variety of causes may bring out dead streaks in cane leaves, but these streaks are characterised by always having a very narrow dull-red margin, and by being prolonged at their lower end (where the streak originates at a dead tip) into a fine irregular broken yellow line with here and there a dot of red. If the tissue of this broken yellow and red line be examined with a high-power microscope it is found to contain tremendous numbers of the microbes which cause the disease (*Bacillus vascularum*), so that the dead streaks are the result of the activities of these microbes and follow the advance of the yellow line.

The leaves of the diseased sticks are very much wilted and if these sticks were cut open the gum would very soon exude from them. It should be noted that by the leaf symptoms gum can be detected before there is sufficient of it to be caused to exude from the stick, hence the value of the method. However, as the streaks only appear at certain times of the year differing more or less in every district, a constant watch should be kept so that when they do appear advantage may be taken of the opportunity for selection of blocks to be kept for later planting. Mosaic disease is present throughout, but as most growers are able to detect it the disease is being kept at a minimum by roguing and by plant selection. Root disease of an acute nature, similar to the "Foot-Rot" described in the Mount Bauple notes, was found attacking the M. 1900 seedling in most localities. The disease, so much resembling Iliau, is doing slight damage throughout, and serious damage in the North Isis and parts of the Lynwood locality. The disease consists of an exceedingly tight binding of the leaf sheaths of young plant and ratoon cane by a copious growth of fungus in the spaces separating the leaf sheaths. This growth binds the bases of the leaves so very tightly that the latter cannot be separated without tearing. The result of this affliction is that the growing point of the shoot is unable to grow any further in an upward direction and so swells laterally and bursts the binding leaves, often forming a great bulb-like projection on one side of the shoot.

While this is going on the young tissues of the stem are attacked by the fungus (*Melaconium iliau?*), and the stem in most cases is killed. The disease was seen in several varieties (H.Q. 458, Q. 813, D. 1135, M. 1900 Seedling), but was at its worst in M. 1900 Seedling. With regard to the control of this disease the methods suggested under "Foot-Rot" in the Mount Bauple notes could be tried.

Insect Pests.—The most serious insect pest in the Isis district is the cane grub, which was identified in 1921 as *Pseudholophylla furfuracea* (J. F. Illingworth, Bull. No. 16, 1921). This grub very much resembles that of *Lepidiota frenchi*, but can be readily distinguished from it by the fact that if it be placed on a piece of level ground it will soon slowly move away by crawling on its back, which *frenchi* never does. There is every need for a systematic study of the life history and habits of this grub before chemical control can be contemplated. There is no doubt that great differences could be found in the habits of this species of grub and those of our Northern ones; differences in feeding habits, for instance, which would lead to discoveries of suitable baits for poisoning or of satisfactory trap crops. During my visit I met one grower who had tried carbon bisulphide as a fumigant for these grubs and had obtained good results. The soil, being of a very loose and friable nature, is very much suited to this form of control. The method at present in general vogue for the control of this pest is the old and good one of collecting both grubs and beetles. By clearing the land in this way the insect is largely checked. Other factors known to control the grub in these parts are the digger wasps, the Muscardine fungus, and mites, though there is some doubt as to the true function of the latter.

Wire worms, moth borers, and white ants (*Termes* sp.) are other insect pests which are responsible for slight injury to crops in these parts.

Cane-killing Weed.—The cane-killing weed was found doing appreciable damage to a crop of first ratoon D. 1135 in fairly "new" forest land at Horton. Several fairly big patches of the affected block were almost completely killed out through the agency of this weed (*Striga* sp.).

20th November, 1924.

Bundaberg, Fairymead, Bingera, Bucca, Gin Gin, Avondale, and Yeppoon were included in the districts visited.

DISEASES.

Leaf Stripe.

As there is a great deal of confusion, from the average farmers' point of view, between this disease and Mosaic, it would not be out of place for me to give a brief description of Leaf Stripe. In its early stages the symptoms of this latter disease resemble somewhat those of Mosaic, and if one were not acquainted with both, Leaf Stripe might be taken for Mosaic. In both diseases certain irregular longitudinal markings are found on the leaves. In Leaf Stripe these take the form of irregular light-yellow lines which run along a group of veins in the leaf. These lines are seen to be actually of a light-yellow colour, which is of itself sufficient to distinguish it from Mosaic disease where the markings are not long enough to be called lines or stripes and are rather of a light-green colour—*i.e.*, of a lighter green than the remainder of the leaf. Another very clearly defined distinction is that in the case of Leaf Stripe a light downy growth of white fungus is seen on the under side of the yellow stripes, this fungus being the actual aerial growth of the parasite which causes the disease. The presence of this fungus has led to the synonym "Downy Mildew" of sugar-cane. The disease is a very serious one, indeed, as the affected stem is invariably killed by the fungus if it is not cut previously. Again, the disease is very contagious, being spread in the form of spores, or germs, by the wind, so that should these spores lodge on a receptive leaf the fungus will rapidly infect the stool and spread further. And, furthermore, a diseased stick when used for plants will produce diseased stools. Thus when a stool is seen to be infected it should be uprooted and burnt at the earliest opportunity. Where a whole field is found to be diseased it should be ploughed as soon after cutting as possible, and previous to cutting the cane should be burnt, as by this means many billions of virulent spores will be destroyed.

The disease was found doing damage at Bingera where a variety known as B. 156 has proved quite unable to offer any resistance whatever to this serious disease. Other varieties attacked included Shahjahanpur No. 10 (rather badly), 7 R. 428—Pompey (rather badly), H.Q. 409 and D. 1135 (lightly). Mr. A. Gibson, who is very well acquainted with the disease, informed me that he had also found Leaf Stripe in a couple of stools of Uba which were growing near diseased cane. A variety which appears from observations at Bingera to be very resistant to the disease is N.G. 16.

Mosaic.

This well-known disease was met with in all the districts visited. It does not appear to be doing serious damage in the outlying areas of the Bundaberg district, but the loss caused by it in the coastal localities (Woongarra and Fairymead) can well be considered as important. Especially is this the case in the Woongarra, where it would be perhaps impossible to find a field of cane free from Mosaic. Many fields show infections as great as 20 per cent., the affected stools being invariably stunted. These high infections were particularly observable where Johnson grass occurred in the field. This grass harbours, as a rule, many plump little blue-coloured aphides which there is small doubt are able to carry the disease. These aphides are also found at times on corn and sorghum which, with the Johnson grass, are known to be subject to sugar-cane Mosaic. At certain times of the year these aphides occur in a winged form, and being but poor fliers are buffetted about by the wind when they take wing if the wind is at all strong.

One grower mentioned to me that he found that supplies contracted the disease more readily than the usual plants. He showed me a field of D. 1135 first ratoons where misses had been made up, when the cane was in its plant stage, with Black Innis carefully selected to be as far as was possible free from disease. Yet at the present time almost 100 per cent. of these misses are infected with Mosaic, while the D. 1135 is comparatively free. Now to the north-east—*i.e.*, to windward of this block, which was almost perfectly free from weeds—was a field of volunteer ratoons, recently cut, which was in a state of neglect, being simply overgrown with Johnson grass. On the Johnson grass were found quantities of the blue aphides. Thus it seems that the failure of the supplies was probably due to three causes—(1) Black Innis is a very susceptible variety to Mosaic; (2) supplies are usually of lower vitality than normal plants, being overcrowded by the latter; and (3) Mosaic is known to attack Johnson grass, and the disease could very well have been carried to the cane by the little aphides which would be blown from time to time into the cane from the grass by the strong north-easterly winds which are prevalent here. Thus, as is the case with all other diseases in plants

remedy lies in strong co-operative effort on the part of the farmers in infected areas in the eradication of disease-carrying plants from their fields, roguing of diseased stools where this is practicable, and the planting of healthy cane only.

The disease was found in only one small block of cane at Yeppoon. This block is being destroyed, so it is to be hoped that the disease has not yet found its way into the local grasses.

Gumming.

Gumming disease is probably fairly widespread in the Bundaberg districts, but as the characteristic leaf markings which show its presence were not very evident at the time of my visit, little of the disease was observed. A great deal of the D. 1135 at South Kolan was found to be infected, but is not suffering serious injury therefrom. The disease was also met with at Margam, Windermere, Greenville, and Fairymead in the varieties D. 1135, H.Q. 426, and M. 1900 Seedling; while it was reported to me from Springfield and Gin Gin.

Foot Rot.

This fungus disease is well worthy of mention, as it is responsible for severe loss to growers in plants which it kills when very young. Where a plant manages to survive the fungus attack the stool remains a weakling throughout its life. Studies of this disease should be made at the earliest opportunity. Growers are referred to the writer's report on the Mount Bauple district, published in November.

Minor Diseases.

Under this heading can be recorded the finding throughout the districts visited of obscure root diseases which, while very seldom causing total destruction of cane, must cause appreciable annual loss of tonnage. These root diseases are generally brought about by inauspicious soil conditions, and can, as a rule, be remedied by application of suitable manures or by improved cultivation. Another disease of minor importance observed at Bundaberg is that known as Cytospora Rot, a fungus disease which was brought to my notice by Mr. North, Pathologist to the Colonial Sugar Refining Company, who was visiting the district.

INSECT PESTS.

Grubs.

Several species of cane grubs not usually met with in the far North were found doing great damage to crops in some of the districts visited, especially Gin Gin, Bingera, and Bucca. Two grubs in particular are responsible for these depredations—*Lepidiota* sp. 666 (or a very closely related species) and *L. grata*. Both of these, it seems, have a two years' life cycle. Both attack young plant cane as well as mature cane. Their joint efforts have meant a loss of many acres of otherwise healthy cane to some Gin Gin farmers. At Bucca the loss has not been so great, while at Bingera this pest is controlled fairly efficiently with carbon bisulphide. *L.* 666 is a grub which attains a length of about 1¼ in., and, though smaller, very much resembles *L. frenchi*. *L. grata* is a smaller species, and is almost a replica of *L. rothei*. From statements made by growers in these districts, it would appear that *L. grata* emerges with the early thunder showers in October, while 666 does not come out until November. Both have but a short evening flight. There seems some doubt as to whether the eggs are ready to lay on the emergence of the beetle—*i.e.*, whether it is necessary for the beetles to feed before laying. As there is talk of forming a Beetle Board in the Gin Gin district, the growers would be well advised to conclusively settle this last-mentioned question before planning their collecting campaign, since efficient control by collecting is, to a large extent, dependent on an accurate knowledge of the ovipositing habits of the female beetle. Owing to the shortness of my stay in the district, I was unable to touch on this aspect of the matter. It was very gratifying to note that one grower at Skyring's reserve was preparing to control the pest with carbon bisulphide during the coming season. As in normal seasons the damage occurs in small patches, this form of control is very good. By pulling up a stool here and there a while before the grubs usually do their damage, the location of the grub centres could be ascertained simply by finding the young grubs under the stools. These spots could then be treated, and a great many stools saved for each one destroyed in the search for grubs. Further information on this phase of grub control could be obtained by communicating with the Entomologist of this Bureau (Mr. E. Jarvis), Meringa, near Cairns.

The Black Set-Beetle and Wire Worms.

The Black Set-Beetle (*Pentodon australis*) was found damaging young cane shoots throughout most of the Bucca area. This beetle is in the habit of attacking young shoots of plants near the point where these join the set, and very often they

attack the set itself by boring holes into it. As a rule, the damage caused by this insect is not serious, since the affected shoot will often shoot up again from below the spot where the beetle has gnawed it. But sometimes a small epidemic of beetles will occur, and the cane will suffer accordingly; especially is this the case where the land has been growing paspalum grass previous to sugar-cane, as the roots of this grass are very much favoured by the beetle. The beetle is a small, compact shining-black insect, little over half an inch in length, so that it cannot very well be mistaken when found about the plants. Control measures are not warranted as yet. A pest which causes similar damage to the Black Set-Beetle is the wire worm. It is very probable that the wire worm is often blamed for destruction wrought by the beetle. The wire worm was complained of by growers in most parts of the districts, but especially at Gin Gin and Bucca. One grower in the former district stated having found the dusting of plants with a little slaked lime a very efficient method of prevention for wire worms. This should be done by throwing about a quart of slaked lime on to the plants while these are in the planter.

Other Insect Pests.

The large Moth Borer was found effecting more or less injury throughout, particularly in dirty fields. Adults of *Dasygnathus australis* were captured at Bingera and Gin Gin. The beetles *Isodon puncticollis* and *Neso flavipennis* were met with at Bundaberg.

TOMATO CROPS—FERTILISER TRIALS.

Mr. N. A. E. Pollock, Northern Instructor in Agriculture, supplies the following results and remarks on a series of trials with various mixtures of fertilisers on tomato crops in the Bowen district during the season just concluded.

The fertiliser mixtures were at the rate of 200 lb. per acre, applied broadcast on the soil in even quantities, for each plant in a circle of 5 feet diameter of which the plant occupied the centre and worked into the soil with the cultivating implement. The fertiliser mixtures were as follows:—

Plot.	Super.	S. Potash.	S. Amm.	Earthy Lime.	Approximate Cost.
	Lbs.	Lbs.	Lbs.		£ s. d.
1	140	40	20	..	1 0 0
2	120	30	30	20	0 18 7
3	120	40	40	..	1 2 0
4	120	30	50	..	1 2 0
5		Control no	Fertilizer.		
6	120	20	60	..	1 2 0
7	100	30	70	..	1 3 10
8	180	30	70	20	1 2 6
9	100	50	50	..	1 3 10

In the foregoing Super. stands for Supherphosphate, S. Pot. for Sulphate of Potash, and S. Amm. for Sulphate of Ammonia.

As regards the percentage of Phosphoric Acid (P), Potash (K), and Nitrogen (N). The mixtures show—

Plot.	(P) %	(K) %.	(N) %.
1	12	10·4	2
2	10·2	7·8	3
3	10·2	7·8	4
4	10·2	10·4	5
5	..	..	..
6	10.2	5·2	6
7	8·5	7·8	7
8	6·8	7·8	7
9	8·4	13·0	5

The experiments were carried out on the farms of Mr. T. Moller, Bowen, N. Earl, Don Delta, and C. E. Jones, Euri Creek. The yields on each worked out to an acre for each plot are—

Plot.	MOLLER.	EARL.	JONES.
	Lb.	Lbs.	Lbs.
1	6,880	16,970	16,920
2	6,500	14,600	18,360
3	6,450	14,610	14,840
4	7,170	16,370	16,780
5	4,020	16,670	16,640
6	5,390	19,220	15,900
7	4,960	19,000	19,940
8	4,930	19,080	21,160
9	5,360	16,770	19,360

Mr. Moller's plot proved to vary greatly in the quality of soil, and beyond proving the benefit of the application of fertiliser, the result does not, in comparison with the results of Messrs. Earl and Jones' plots, point to any definite conclusion.

Messrs. Earl and Jones' plots proved to be on soil of more even quality, while the yields with each mixture, except in two instances, agree very closely.

Mixtures in Plots 7 and 8 show the best results on each of these farms, that on No. 8 being best. This mixture is very close to the fertiliser placed on the market for sugar farmers as .7.7.7, or "Three Sevens," which can be recommended for trial during next season.

The various mixtures were prepared with a view to testing increase in yield, effect on foilage, flavour, quality, and weight for size of fruit. On all the fertilised plots the fruit was superior to the control or non-fertilised plot, while the plants showed better colour and more leafage.

For general excellence in yield and quality of fruit, Messrs. Earl and Jones agree in favouring Plot 8.

It may be noted that Wilt resistant varieties of tomatoes were grown, and there was no disease noticeable on any of the plots.

In the yields given, all fruit, whether marketable or not, is included.

THE FARMERS' WOOL SCHEME.

A YEAR'S OPERATIONS.

The operation of the farmers' wool scheme for the year ended 30th June, 1924, shows a substantial increase in new business and amount of treated wools sold. The only losses of clients are those who, by increase of the numbers in the flocks, automatically drop out. The limit is 1,500 fleeces.

Wool was sold at the various sales during the year to the amount of about £6,000, and the number of fleeces in individual flocks ranged from one fleece up to eight bales. The total number of finished bales was 263, and the average price per bale worked out at about £22 per bale for all qualities. The prices of the various qualities work out—

Type.	Highest.	Lowest.
Merino fleece	31d.	19½d. per lb.
Merino hoggets	31d.	21½d. per lb.
Merino pieces	26½d.	17d. per lb.
Merino bellies	22½d.	16½d. per lb.
Merino stained	15d.	12½d. per lb.
Merino locks	11d.	10d. per lb.
Merino lambs	26½d.	15½d. per lb.
Comeback fleece	30d.	14d. per lb. (Burry)
Comeback hoggets	31d.	21¼d. per lb.
Comeback weaners	21½d.	13d. per lb.
Comeback lambs	21½d.	13d. per lb.
Crossbred fleece	26¾d.	10d. per lb.
Crossbred pieces	21¾d.	15d. per lb.
Crossbred bellies	18d.	18d. per lb.
Crossbred stained	12d.	12d. per lb.
Crossbred locks	8½d.	7½d. per lb.
Crossbred hoggets	25d.	21½d. per lb.

The crossbred wools showed a very big advance on the previous year's figures, and it seems as if the prices for farmers' wools have reached a very lucrative level. The scheme is now thoroughly established and retains the confidence of the smaller holders.

Season and Blowflies.

The season in Queensland was very dry up to about March, and in that month general rain fell in bounteous measure. With the advent of rain, blowflies made their appearance almost everywhere. This was to be expected. The palliative offered by the experiments at Gindie and Dalmally wherever used gave excellent results. The Queensland formula of jetting arsenic into the breech of the sheep has now been formally recommended by the New South Wales Government. It has borne the test of time in giving at least a two or three months' protection.

Stomach Worms.

Another pest which is attaining serious dimensions is the Stomach Worm (*Strongylus contortus*). It is about time that a combined effort on the part of pastoralists and others be made to control the plague. I am seriously of opinion that the worm pest is worse than the blowflies. The worms we have always with us, while there is often absence of the flies, especially in dry weather. The worm pest, too, induces the flies to attack sheep where a healthy flock often escapes. A method of attack successful on the pest is outlined in the "Farmers' Sheep in Queensland" Bulletin, p. 34.

Lambing.

Since the rains in March and later, there has been an excellent lambing over the whole State, and there is every prospect of a good spring. Many visits have been made to farmers and others during the year. Included in these was one to the Tableland, where, after inspection of most of the country, six lectures were delivered to groups of farmers. It was found that there is no part of Queensland more suitable for small flocks of sheep, and there is a strong movement on the part of farmers to acquire a small flock, as everywhere else in Queensland, dogs, wild and domesticated, are the great drawback to the keeping of sheep. Something must be done in the direction of dog control, or sheep keeping, the most lucrative of callings, will be hampered so much that many will drop out of the business, while hundreds of farmers are afraid to take it on. It is really a national question. Lectures were given at other centres such as Springsure, Capella, Gatton, Purga, and other centres.

Coastal Sheep.

There is still going on a movement to put sheep on the coastal areas. Several cattle holdings are being converted into sheep properties, notably at Gin Gin and Beaudesert. Small flocks are established here and there from the Tweed River to Burketown on the Gulf, while nearly every island along the coast, including Moreton Island, is stocked with sheep.

Practically the whole of the sheep districts of Queensland were visited in the course of the year by your officer.—W. G. BROWN, Instructor in Sheep and Wool.

WHEAT CROP ESTIMATE, 1924.

Districts.	GRAIN.		HAY.		GREEN FODDER.
	Acres.	Bushels.	Acres.	Tons.	Acres.
Darling Downs ..	161,678	2,426,973	9,531	11,061	17,242
Maranoa	14,369	254,396	700	1,050	6,000
Wide Bay	1,256	21,070	317	536	597
Moreton	476	9,775	3,104	4,834	1,715
Other	..	..	95	76	266
Total State, 1924 ..	177,779	2,712,214	13,727	17,557	25,820
Total State, 1923 ..	51,149	243,713	8,714	5,095	116,644
Increase, 1924 or — Decrease, 1924	126,630	2,468,501	5,013	12,462	— 90,824

From recent reports it seems likely that this estimate may be slightly in excess of the crops harvested

BANANA GROWING AS SUCCESSFULLY PRACTISED IN THE KIN KIN DISTRICT, NORTH COAST, QUEENSLAND.

By C. N. FREEMAN.

Mr. Freeman is one of the most successful banana growers in Queensland and his product has created and sustained a creditable reputation on Southern markets. A graduate of Hawkesbury Agricultural College, Mr. Freeman gained further practical fruitgrowing experience at the Wagga Experimental Farm and on the Yanco Irrigation Settlement. Later he purchased land at Kin Kin, in this State, after some experience of banana growing on the Tweed.

The principles of banana culture, as set out, have received the endorsement of the Fruit Branch of the Department of Agriculture and Stock, and are applicable to Southern and Central Queensland, and, with slight modification, the State generally.. The instructions given and recommendations submitted cover every phase of profitable banana growing.

The information courteously supplied by Mr. Freeman, being the outcome of personal experience in the Kin Kin district, will be appreciated by both new and old established planters. His advice is sound, and is backed by practical and profitable results, and may be followed without hesitation by growers bent on securing a maximum of material benefit.—Editor.

Selecting a Site.

In selecting a site suitable for the growing of bananas great care should be exercised as this is probably the most important feature of the business. A rich friable scrub or bastard scrub soil above frost level is preferred, yet in some forest lands containing a quantity of rotten shale they are found doing well, but in any case there should be perfect underground drainage and the soil must be loose. The banana plant loves warmth balanced nicely with moisture both in the soil and atmosphere, and an easterly to nor'-easterly aspect, close to the sea, with a good annual precipitation, gives these requirements. In abnormally dry seasons well sheltered northerly positions are too hot, but in wet seasons the plant simply revels in the conditions as both heat and moisture are balanced. With the easterly aspect also a plantation is sheltered from the cold westerly winds, but sometimes exposed to the southeast weather prevailing in the wet season (January-, February, and March) in which case a belt of scrub should be left standing. One must also consider the capabilities of the site in the transportation of the fruit to the road level.

The best time to fall the scrub is in May or June. It will then have time to dry and allow the bark of the logs to crack ready to be fired in suitable weather in October or November. After the fire all small pieces not burned should be picked up and the ground cleared as much as convenient, and the time thus spent will be well repaid later on. Tracks of from 4 ft. to 6 ft. wide should be made in easy grades to facilitate the drawing of the suckers at planting time and later on the fruit.

Holing.

In digging the holes it is advisable to use sight sticks and a rod cut to the required length for marking so as to get them in line and as near as possible the right distance apart. A big hole should be dug not less than 15 in. wide at the top and bottom, the depth governed by the class of soil. If it be particularly deep and loose 16 to 18 in. is advisable, and if inclined to bake, say, 15 in.; but no hard and fast rule should be set out when digging. In preparing a hole the top soil should be left at the top side as this can be used when planting the sucker. There is a diversity of opinion regarding the distance apart that bananas should be planted, and it is generally conceded that it all depends on the care and method exercised in the suckering. If planted 9 ft. to 12 ft. apart two or three suckers can be left to ratoon, but if planted from 6 ft. to 8 ft. one sucker only can be left, in such a way that one bunch only per year is harvested. The usual practice, however, is to plant 10 ft. to 12 ft. apart.

Selecting Suckers—Planting.

All holes should be dug before the digging of the sucker from the parent plant is proceeded with. Although a sucker takes considerable time to completely dry out or die it is advisable to plant as soon after digging as possible. In selecting a sucker for planting old stools that the grower has decided to allow to run out are

preferred to take them from, but the plantation must be clean of weeds, diseases, pests, &c., and the sap flowing freely through the plant, and this time coincides with the time of planting—December-January. In any case suckers should never be taken from plants before or on their first bunch, as they are usually very soft and a great deal of damage is done to the parent and sucker owing to their depth in the ground. The type of sucker to select is one showing a big round corm and a short cone top with no leaves and about as large as the two fists together. It will be found difficult to obtain them all the same size, but desirable to have them as near as possible alike. The crowns of big suckers are satisfactory providing the centre is scooped out and only one life left and a good slice of the bottom cut away, as the best roots come away from the level of the eye. These crowns can be cut in two or three sections, providing there is an eye for each section. A good tool for removing the sucker from the stool is a wide spud bar with a long pipe handle. After digging, the roots adhering to the sucker should be cut close up to the corm without damaging it. Remove all eyes from the sucker also.

When planting put the side of the sucker that has been severed from the parent facing down hill so as when the plant grows and the young suckers appear they will be at the back of the plant. The soil on the top side of the hole can now be pulled in and tramped firmly about the sucker or crown, and in the case of very small suckers they can be completely covered but by not more than 2 or 3 in.; in any case the hole should not be filled, and as the suckers grow a hole similar in shape to a saucer retained around the plant. This will tend to keep the subsequent suckers and roots well down.

When to Plant.

As mentioned above, December and January are the best months to plant. In the first place the selected sucker is growing and all wounds to the corm will callous up and the plant will strike immediately. They will do this much earlier in the season and later too, but there are other considerations. It is found that the best bunches and best fruit are grown in January, February, and March, and this fruit when harvested four to five months hence will meet the best market, and the fruit can be allowed to remain until fully matured. There is no loss through ripening or boiling, and it will be found that it is approximately twelve months from planting to bunching time if planted at this time of the year. On southerly or cool situations it is preferable that all the planting should be done by the latter end of December. On eastern and warmer sites planting can be deferred until the middle or latter end of January. If planted at this time they will get the benefit of the wet season and be well established ere the winter arrives and will keep growing right through it, providing the situation is warm.

Keep the Plant Growing.

Immediately the planting is finished all weeds should be kept down and not allowed to seed, and the saucer around the stool retained. The plant should be kept growing and not have a check, as this is the most critical stage of its life. Where hard patches of soil are found they should be broken with a forked hoe and whenever holing, the ground must be hoed, and incidentally the weeds, and worked up as deeply as possible. If this is done each time, a deep mulch will be obtained that will retain all quick rains and danger of washing will be lessened. If the soil is inclined to set in spite of this, a good deep fork hoeing should be given in the winter time and the ground left in a rough state and worked down with subsequent chippings. As bananas are usually planted on hillsides amongst stumps, logs, and roots, horse work cannot be practised, and in any case it is undesirable as handwork will give better net results.

Suckering.

In September following the planting a number of suckers will have appeared around the parent. These must be thinned out according to distance apart of the stools mentioned before, and in the case of 6 ft. and 8 ft. plantings one good, deep, hard, cone-shaped sucker retained. If the eyes have been cut away from the parent before planting, and providing it was not large when planted, it will be found that the biggest sucker of the right type will be the one desired. One growing at the back or side is preferred, but if in the front only it can be left, but all subsequent baby suckers of this should be grown at the back as the plant will work too shallow. In the case of 9 ft. to 12 ft. apart, one sucker of the right type left on each side, all others scooped out deeply and never chopped off with a grubber or bar. When in turn these suckers grow, one sucker each should be left. It will be found that before the end of the year more suckers have sprung up. These should again be removed so as not to hinder the growth of these selected. This will occur repeatedly up till winter time, and it is important that there should be only the selected suckers growing. No pruning or suckering should be done in the winter time.

When to Cut.

When the bunch is thrown, a strong prop about 6 ft. long should be inserted in the base of a leaf conveniently situated and the other end pressed firmly into the ground to support the sucker and bunch, and when the flower shields dry and separate from the stem they can be pulled out and the bud cut off the bunch when it has grown away sufficiently from the last hand of bananas. If the bunch is not sheltered from the sun by its leaves it is desirable to break down the last leaf and put the bunch completely in the shade. By doing this the fruit will retain a soft green, all the bananas fill evenly, and be protected from the strong rays of the sun. The fruit should never be cut until it is matured, and that is when they attain a full round appearance, the judgment of which is quickly acquired. In hot weather for far distant markets the fruit must be cut before maturity. In this case the hands should be broken into too small clumps.

Careful Handling Necessary.

After the bunch is cut the leaves of the stalk should be removed leaving the stem standing, as the root system of this will be utilised by the baby sucker and the residue contents absorbed by it. This is particularly valuable in dry time, and wonderful growth of the sucker will be noticed. The bunch should be very carefully handled, in the case of one being carried—by one hand on the stalk end and the other on the flower end. In the case of two, a yoke can be utilised or carried hanging down at one side, but in any case never carried on the shoulder. Too great a stress cannot be put upon this as it is at this stage that the greatest cause of Blackend or ruptured stem is occasioned. The bunches should be put down carefully, preferably on their side on a thick heap of trash, and covered over with leaves to protect them from the sun.

Where it is possible the bunches should be conveyed to the shed per overhead wires, thus facilitating handling with a minimum of bruising, as the banana is the most delicate fruit grown, the slightest knock showing black after ripening. Where wires cannot be used a slide with well-padded sides and floor can be requisitioned. The bunches should be stood up and placed in firmly so there is no rocking. On arrival at the shed they should be stood up singly on bags to prevent damage to the bottom hand and never heaped one upon the other. If the bunches are allowed to remain over night they will toughen and there will be less staining after being cut off, but bananas will never sweat on the bunch. The hands should be cut off with a small piece of stem adhering so as they can be broken apart easily, and this should be done by a to and fro movement by the packer according to how the fruit lies on the hand. When the hands are cut from the bunch they can be graded as near as possible and placed concave downwards hand upon hand. The grower's packing shed should be floored and the walls built showing no cracks, yet having plenty of ventilation in the way of windows or shutters half way up the wall so as to allow a draught of air to be continually passing above the fruit, carrying away the carbon dioxide which emanates from them. This particularly applies to the summer season. The fruit so handled will be cool when placed in the cases.

Packing and Grading.

At the present time different markets are demanding a different way of packing bananas. It would be an advantage to everyone concerned if a standard pack was evolved and a case label or stencil showing the grade and number of bananas contained therein placed upon the case, as is the case of citrus, apples, &c., but whichever way they are placed in the case it should be done very carefully and tightly, and the grade true in length and circumference. The method which is proving itself on the Sydney market is the single pack, placed on their sides with the stem out, working from one end of the case to the other, reversing each row so that each layer is bound, and when the case is opened on its side for inspection the stem ends are pointing in alternate directions. This is an attractive pack with a big count and carrying well. For Melbourne the desired method is to start the bottom layer with two joined bananas one upon the other, packing very tightly, and subsequent layers in single hands of threes and fours placed concave downwards with singles to fill in where required. Fruit needed to fill in centre space should be stood on their ends after two layers are packed and outside rows built up around them. In both cases the fruit should be packed tightly and brought above the case a little to show just a fair bulge when nailed up. The nailing of the lids should be done by the aid of a clamp and bumped down.

It is most essential that growers pay the greatest attention to the grading of their fruit, and only that of extra choice and choice quality sent to the Southern markets. If the bunches are showing only a small percentage of choice grade it would pay the grower to put it on the closest market on the bunch.

When loading lorries or trucks place all cases on their side and not on ends.

Cultivation and Manuring.

After a period of time which is governed by seasons and environment, the banana plant works up very closely to the surface of the soil and becomes prone to the effects of adverse conditions which materially reflect themselves upon the quality and quantity of the fruit. It cannot be said that the soil has been depleted of all its plant food, or, in other words, "worked out" as the accumulation of humus in the form of leaves, bark, &c., from the original scrub or forest has been going on for centuries, but it seems a matter of cultivation and a short period of rest that is needed, together with the breaking up of the old plant and replanting to put matters right. We know that the arrowroot or any other bulbous plant will come almost out of the ground in a very short time, and that when the clumps are broken up and the ground well cultivated a second crop can be obtained almost as good as the preceding one. If the soil was well worked, planted with one of the leguminosae order of plants, such as the cowpea, &c., eventually turned under in a green state, and generally rested for twelve months, the results would be even better. Whichever way is adopted the holes should be dug in a different place than where the old stools stood, and, after planting, an application of about 5 cwt. per acre of a complete fertiliser spread on the surface about 3 to 4 ft. from the new plant and worked in lightly. A mixture containing for its component parts sulphate of potash, with sulphate of ammonia or nitrate of soda next and a phosphoric acid manure to complete it, is necessary. There are brands on the market containing these. When replanting allowance should be made for the slowness in the growth of the plant compared with the virgin crop and two months should suffice.

Manuring can be practised without replanting and if this is desired two applications of the same mixture as above should be given, say, 4 to 6 lb. per stool spread evenly all over the ground, and if the ground has been well cultivated previously, chipped in lightly, but the two operations of manuring and cultivation could be done simultaneously. The fertilising mixture given above is quick acting, and should not be applied to a dry soil, and only when the plant has ample moisture requirements. The best months to fertilise are August and December.

Thoroughness the Watchword.

Banana growing is very fascinating as the plants respond to good treatment, and is the means by which a conscientious man with small capital can make a start on the land without having to wait very long for a return; and as it is usually carried on in districts with a good and regular rainfall, risk from failure through bad seasons is reduced to a minimum. But planters must apply themselves intelligently, make "thorough" their watchword, and do the right thing at the right time all the time.

THE SUFFOLK SHEEP.

The extent to which public demand influences the products of the field is scarcely better illustrated than by the rise into popularity and fame of Suffolk sheep. This rise has taken place in the memory of those amongst us who are not very old. Until there was a marked demand for lean mutton the day of the Suffolk had not arrived, and although the breed has been in existence for at least from thirty to fifty years, what may be called the improved Suffolk is really the creation of little more than a decade.

Like the Oxford and Hampshire Downs, the Suffolk Down is essentially a made breed. Its constituent elements are the Southdown and the old Norfolk horned breed. Traces of its foundation parents are easily found even to-day in the rudimentary horns, which appear much more frequently than is desired, and the still more objectionable number of black staples which appear on the wool. When the breed was first represented at Kelso, Scotland, perhaps thirty years ago or less, the specimens presented gave no promise of the distinction to which the breed has now attained. They were condemned as "hard beggars" and "dour feeders." After the false start, for a good many years Suffolks were not seen at Kelso, and, as a matter of fact, it would have been difficult to give away a Suffolk ram in Scotland. As, however, the demand for lean mutton grew in intensity, and especially as the carcass competition at Smithfield gave the butchers the opportunity long desired of showing publicly what was needed to meet the public taste, the opportunity of the Suffolk-Cheviot crosses swept the boards in the carcass competitions, and to their lasting credit, be it said, the breeders of Suffolks rose to the occasion. The breed society sent right good specimens to the Kelso sales; Scottish farmers bought and tested, with the results which are now patent. Last year, at Kelso, the breed had two rings devoted exclusively to itself, and it shared a third with other breeds. The success achieved by Suffolk Down breeders in South Australia proves conclusively that the breed is destined sooner or later to enjoy wide popularity. Young flocks already in existence in that State have thrived well, and have given payable returns, while for crossing purposes they have given every satisfaction—"Stock and Station Journal," Melbourne.

THE FOOD VALUE OF DRIED WHEY SOLIDS.

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At many cheese factories there is difficulty in disposing of the whey. The great volume produced and the irregular output make it difficult to feed the whole of it to pigs in the immediate vicinity of the factories, and the bulk is so great in proportion to the solid contents that the stuff will not bear the cost of transport.

The solids, however, are rich in the constructive materials required for formation of bone and soft tissues in growing animals. Experiments carried out in America by McCollum have shown that the protein of whey is much more valuable for growth than that of grains. The salts, too, are specially suited to the requirements of young animals, since the different minerals are present in the proportion needed for growth, while in almost all other foodstuffs there is a deficiency of some and an excess of others. Milk sugar, the third chief constituent, is an easily assimilated carbohydrate which the stomach of the young animal is specially adapted to digest. Hence, though almost the whole of the fat and the most of the protein have been removed from the milk to make the cheese, the residue of the solid matter left in the whey has a very special food value, and it amounts to nearly half of what was originally present in the whole milk. The well known beneficial effects of feeding whey to young pigs can therefore be easily understood. It is the great bulk of water, amounting to nearly 94 per cent. of the total amount, that makes it difficult to utilise whey as a feeding-stuff.

At the factory established at Crewe by the Ministry of Agriculture whey solids and lactalbumen (the protein of whey) can be produced as dry powders. The following table gives an idea of the composition of these products:—

——	Protein.	Fat.	Carbo-hydrate.	Mineral Matter.	Water.
Solids of Whey from which Fat has been separated	12	1	69	8	10
Lactalbumen	76	2·5	7·5	3	11

These are concentrated food stuffs, easily handled. As there is a possibility of them being available as feeding-stuffs it was thought that it would be of interest to make practical tests to determine to what extent the nutritive value of milk is retained in these residues. Through the courtesy of the director of the Government factory at Crewe supplies of them were obtained, and the following experiments were carried out with young pigs at the time of weaning:—

Value of Milk Residues Compared with Whole Milk.

In this experiment a mixture of whey solids and lactalbumen was compared with whole milk. A litter of ten pigs, thirty-four days old, was divided into two groups of five each. They were allowed to continue sucking the sow, but three times a day the sow was driven off, and the two groups were separated out. One group was offered whole milk, and the other a mixture consisting of seventeen parts of separated whey solids to two of lactalbumen, the mixture being made up with water to the consistency of milk. The young pigs were allowed to drink as much as they wished, and account was kept of the amount eaten.

During the first week the pigs in the group receiving milk ate more greedily and put on more weight than those receiving the milk residues, but later those in the group receiving the milk residues ate as well and put on as much weight as those receiving whole milk. At the end of the twenty-eight days there was little difference in the weights, as is shown in the following table:—

——	Average Weights at beginnihg.	Average Weights at end of 28 days period.	Total Gain.	Average Amount Eaten.
Whole Milk ..	20·2	38·7	18·7	Milk, 61 lb.
Milk Residues ..	20·9	38·7	17·8	Lactalb., 1½ lb. Whey solids, 8 lb.

* In "The Scottish Journal of Agriculture," Vol. VI., No. 1, January, 1923.

All the animals were in a thriving condition at the end of the experiment, when they were completely weaned and put on a mixture of maize, oatmeal, and fish meal on which they continued to thrive. During the first week after complete weaning, *i.e.*, in their tenth week after birth, the group that had been weaned on the milk residues put on, on an average, 1.16 lb. each per day, and the group that had been weaned on whole milk 1.19 lb.

During the twenty-eight days each animal getting the milk residues ate, on an average, 8 lb. of whey solids and 1.5 lb. of lactalbumen. As these contained about 10 per cent. of water, the total dry matter was about 8.6 lb. In the group getting whole milk each pig ate on an average 61 lb. of whole milk; that is, about 7.8 lb. of dry matter. Compared with the milk residues, therefore, the whole milk gave slightly greater gains for a slightly smaller quantity of dry matter eaten, which is what would be expected when it is remembered that the residues contain such a small proportion of fat compared with the solids of the whole milk.

Value of Whey Solids Compared with Skimmed Milk.

This experiment was devised to test the value of adding (1) whey solids and (2) skimmed milk to a ration consisting of equal parts of maize, oatmeal, and sharps. A litter of fifteen pigs was divided into five groups of three each. Three of the groups were used for this experiment, the other two being reserved for an experiment with other feeding-stuffs not connected with milk. The whole fifteen were allowed to suckle during the twenty-eight days of the experiment.

As before, the young pigs were separated from the sow and fed three times a day. One group received the meal mixture only, another a ration of equal parts of the meal mixture and whey solids, and a third a ration consisting of the meal mixture and whey solids, and a fourth ration consisting of the meal mixture and skimmed milk in the proportion of 3 lb. of the former to 28 lb. of the latter. There is about the same quantity of dry matter in 28 lb. of skimmed milk as in 3 lb. of whey solids, so that the rations with skimmed milk and whey solids were comparable as regards solids contents. The results are shown in the following table:—

	Average Gain in Weight.	Food Eaten per Animal.	
	Lb.	Lb. Meals	Lb. Skimmed Milk
Skimmed Milk plus Meals ..	17·0	17·8	123·6
		Meals	Whey Solids
Whey Solids plus Meals	15·4	11·7	11·7
		Meals	
Meals only	10·8	22·5	

The beneficial effects of adding whey solids to meals are very apparent. An average gain in weight of 15.4 lb. was got in the animals which received 23.4 lb. of the half-and-half mixture of meals and whey solids, whereas only 10.8 lb. gain was obtained in the animal that ate on an average 22.5 lb. of meals. A comparison of the influence of the skimmed milk with the whey solids is not so clear. Those receiving the skimmed milk put on rather more weight, but they ate more food in proportion to the gains. As a whole, the experiment is a demonstration of the very special value of the constituents of milk for feeding young animals, and proves that whey solids as an addition to a meal ration enables much better utilisation to be made of the ration.

Other experiments were carried out to show the value of lactalbumen and the comparative value of whey solids and dried egg which is sometimes available as a feeding stuff. The results, which need not be detailed here, were, in general, the same as those recorded above. The addition of comparatively small amounts of these substances to a ration for young animals has a marked effect on the rate of growth.

Taken together, these experiments bring out clearly the special value of milk residues for growing animals. Milk is a fluid specially prepared by nature to yield constructive material for formation of bone and soft tissues. Whey solids contain nearly half of the solid material originally present in the milk. It is not surprising, therefore, that the addition of this material to the ration of young animals results in increased rate of growth.

The whey solids used in the experiments were obtained from whey from which the fat left after the cheese-making had been removed, so that only a small amount was left. In the solids from unseparated whey there is about five times as much fat as is

present in those from separated whey. No experiments were made with unseparated whey solids, but one would think that these being richer in fat would have given still better results.

Experiments with calves would be even more intersting than those with pigs, The milk of each species is specially adapted to the requirements of the young of that species. The ratios of the different tissue and bone-forming elements found in cow's milk are different from those found in sow's milk. One might expect, therefore, that whey from cow's milk would be more suitable for calves than for young pigs. Experiments to put this supposition to the practical test are in progress here.

The possibility of utilising whey solids for compounding a food for infants after weaning is worth while considering. The period between six and eighteen months of age is a critical one in the feeding of children. At this stage it is a common practice to begin giving foods made from cereal grains. These are deficient both in the quantity and in the quality of the proteins, and markedly deficient in the amounts and proportions of the various minerals necessary for health and growth. Milk added to these foods helps to correct the deficiencies, and to save the child from diseases of malnutrition, such as rickets. According to the results of the first experiments recorded here, dried whey solids should be almost as valuable as dried whole milk. The constituents most deficient in the solids are fat and the vitamin associated with fat. The deficiency of fat-soluble vitamin could easily be made good with the addition of small quantities of cod-liver oil. If whey solids were found to have the same excellent influence on the nutrition of infants as has been found in the experiment on growing pigs referred to here, the material is too valuable to be used as a feeding-stuff for farm stock. The whole of the whey output from cheese factories could be utilised for human food to the profit both of the factory and of the consumer. There is urgent need of a cheap food for children after weaning. The whole question of the availability and utilisation of whey solids for this purpose might well form the subject of a joint inquiry by the physiologist, the medical clinician, and the manager of the cheese factory.

According to Golding, of the National Dairy Institute, the production of whey in this country is estimated at 100,000,000 gallons, and of this one-half is wasted. At cheese factories the loss is as high as 75 per cent. It seems a pity that this valuable material, instead of being completely utilised, is allowed to run to waste to the pollution of the countryside. The writers have no data from which the cost of drying can be calculated, nor is it easy to estimate in money the worth of the dried material per pound. There is no doubt, however, but that the nutritive value of the dried material warrants a considerable expenditure on its preparation. If the Lactose Factory at Crewe can devise means of putting dried whey solids on the market at a reasonable price, it will have performed a valuable public service.

THE WHEAT CROP.

Wheatgrowers on the Downs took full advantage of the recent fine weather which with the bright sunshine and strong south-westerly winds proved ideal for harvesting. Machines were to be seen everywhere at work taking off the grain, a noticeable feature throughout being the efficiency of the harvesting machinery used.

In the case of over-ripe fields, particularly of "Florence" which sheds its grain rather readily, some loss was unavoidable, the "shattering" of the grain often accounting for two or three bushels per acre. Largely on this account a few growers started their machines some hours too early and this grain went into the bags a little on the soft side; however, as the weather was most favourable for the rapid drying of the grain in the standing crops it soon hardened, and as a matter of fact proved after a few days to be a little too brittle.

The concluding inspection of the Downs wheat areas embraced Clifton, Back Plains, Old Talgai, Pratten, Bony Mountain, Cunningham, Wheatvale, Freestone, Warwick, and the Killarney and Maryvale Valleys.

Experimental Plots.

The departmental wheat experiment plots at Allora and Freestone were harvested in the last week of November. Useful data were forthcoming respecting the behaviour of a large number of new varieties of wheat. At Freestone a series of fertiliser trials was carried out, but no difference was discernible between the crops grown on the special plots as a result of the use of the fertiliser. In the field variety trials between different varieties grown without a fertiliser of any kind on areas of approximately 3 acres each the departmental wheats generally gave satisfactory results, notwithstanding the effect of late frosts. It was shown as a result of the latter trials on

this particular farm that when these average wheat yields and those of the departmental wheats were compared, there was a difference in favour of the latter of nearly 10 bushels per acre.

The Fertility of the Downs.

It is generally conceded that the soils on which wheat is grown on the Downs are, if anything, rather too fertile for this crop, particularly in a season like the present. Evidence of this fertility was noticeable in every district visited. In this connection a "scrub" farm at Upper Freestone furnished a most remarkable result as a 42-bushel crop per acre of "Florence" wheat was harvested from land which had been cropped for upwards of thirty-five years and no fertiliser of any kind had ever been used.

A Bountiful Harvest.

Notwithstanding the influence of an abnormally wet season, of late frosts, and in some localities of a certain amount of rust, this year's wheat crop in the aggregate will be a most bountiful one. The earlier harvested grain generally left much to be desired on the score of quality, but the perfect harvesting weather experienced later effected a most pronounced improvement in the quality of the wheat.

The Darling Downs never looked better than they do to-day. The recent maize crop proved heavier than any previously raised. Had prices been at all satisfactory growers would have been compensated for a run of lean years. Lucerne crops are excellent everywhere, but the weather has been against hay-making, and many fields have perforce to remain untouched until the wheat, barley, and canary seed crops are harvested. This year's crop of oats suffered rather badly from rust.

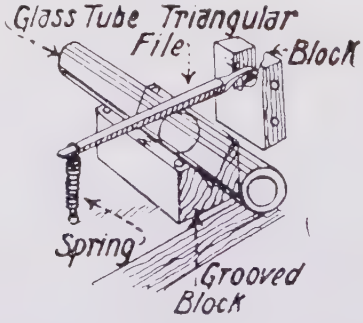
All classes of stock are in excellent condition, and dairy cows are producing well.

Natural grasses, which it was generally considered had suffered a very severe set-back during a run of indifferent seasons, have reappeared and taken the place of much weed growth, which, up till recently, had monopolised a good deal of space in the grazing paddocks.

The bountiful season, however, is responsible for an extraordinary development of noxious weeds, not the least of which is the variegated thistle. This pest if not checked at the outset will soon develop into a serious menace to cultivated land—H. C. QUODLING, Director of Agriculture.

CUTTING GLASS TUBING.

The illustration shows an excellent method of cutting glass tubing. A block of wood with a V-groove cut in it is attached to the bench; a triangular file is arranged across this, the tang of the file having an eye formed in it, which swings on a pin driven through another block atttached to the bench, as shown. The other



end of the file is slipped through the end of a coil spring which is fastened to a screweye driven into the bench, and draws the file downward against the tubing. The tubing is placed in the V-block, between the block and the file. Turning the tube will then cause the file to score the glass, after which a few light taps will break it cleanly.—"Popular Mechanics."

WASTE BANANAS AS PIG FOOD.

During recent visits to the banana-growing areas of the North Coast of this State, the Instructor in Fruit Packing and Marketing, Mr. Wm. Rowlands, has stressed upon growers the wisdom of marketing only the better grades of bananas and of strictly discarding all immature, bruised, damaged, or otherwise waste stocks.

The question of the most satisfactory means of disposing of this rejected fruit was referred to the Instructor in Pig Raising, Mr. E. J. Shelton, who reports that, provided waste bananas are fed in reasonable quantities and that they form only a part of the daily ration, they may be advantageously fed, particularly to breeding sows during the period in which they are carrying their young, and to mature boars. They may also be used during the fattening stages for bacon pigs; this more particularly in the case of ripe fruit. It would be an advantage to allow very green, immature fruit to ripen somewhat before feeding to pigs and to see that all fruit is fed from clean, roomy troughs, placed on wooden feeding platforms, or on areas of clean ground away from mud puddles or other sodden places. Cleanliness in the feeding of any class of food is of prime importance and waste fruit which may be dragged through the mud is no exception.

It should be noted, however, that waste fruit should form portion of the ration only. Breeding sows should also be allowed ample supplies of other green foods such as lucerne, and should have abundant scope to roam over good grass pasture.

If these suggestions are followed there will be no occasion for the banana grower to complain of heavy financial loss as a result of discarding the various grades of bananas referred to.

FRUIT FLY INVESTIGATIONS.

Report of the Entomologist (Stanthorpe District), Mr. H. Jarvis, for September and October, 1924.

A.—FRUIT FLY.

Overwintering Experiments.

Periodical inspection, during the months of September and October, 1924, of the cages of maggot-infested fruit, placed in the field last autumn, has failed to date to reveal any fruit fly emergence.

The soil under two of these cages was put through a seive and carefully examined for fruit fly puparia—living or dead; but none were met with under the cages so examined. It is quite possible that the wet condition of the soil, nearly all through the winter and spring months, would account for the disappearance (*e.g.*, by rotting) of any dead fruit fly puparia that might have been present.

It is, of course, too early this season to pronounce definitely on the question of the overwintering or otherwise of the Queensland fruit fly in the Stanthorpe district from field experiments, but it is extremely likely that negative results pertaining thereto will this season again be obtained. If this assumption prove to hold good, I think we can state as fairly conclusive that *C. tryoni* does not pass the winter months in the soil as a pupa in the Granite Belt.

Fruit Fly in Imported Fruit.

On 15th September information was received from the Instructor in Fruit Culture at Toowoomba, Mr. W. Leslie, that citrus fruit from the North Coast and South Coast districts was arriving at Toowoomba, and that this on examination was found to contain fruit fly maggots.

On 8th October several oranges were received in a sealed package from Inspector C. F. Williams, Warwick. These oranges were found to contain full-grown fruit fly maggots. This fruit was also from the North Coast district. The maggots and fruit were placed in the Insectary, and on 28th October, ten specimens of *C. tryoni* (the Queensland Fruit Fly) emerged therefrom. This happening emphasises the value of the inspection work being carried out at Warwick, by Inspector C. F. Williams, in its relation to Stanthorpe.

First Appearance of Adult Fruit Fly under Natural Conditions.

On 18th October Instructor W. Leslie reported fruit fly on the wing and ovipositing in lemons, at Rangeville, Toowoomba, and on the 19th October specimens were received from him in confirmation.

First Occurrence in the Granite Belt.

On 16th October Inspector E. Stephens reported fruit fly in numbers at Dalveen, and the trapping of specimens with "Harvey Lure."

On the 17th Mr. Stephens brought to this office twelve fruit flies which he had so trapped; and these flies, on examination, all proved to be examples of *C. tryoni*. Five female flies examined were found to contain varying numbers of eggs, many just ready to be laid—one specimen contained as many as 50 eggs, another one as few as 7. It is worthy of note that Mr. Stephens found that the wind, during the time that these flies were being trapped, was north-west.

On the 18th October, fruit flies were found at the Summit, and from then onwards to date, fruit fly captures were reported from various parts of the district, and finally at Ballandean on 25th October.

Fruit Fly Parasite *(Opius)*.

On 16th October a visit was made to Mr. Townsend's property to examine the cage placed over fifty fruit fly puparia which were secured on 29th July in soil under the native fruiting tree, *Notelæa longifolia* Vent. (locally "Australian Olive"). No fruit flies had emerged, nor were any parasites discernible. On 16th October four fruit fly parasites (*Opius, Braconidæ*) emerged in the Insectary, from pupæ obtained under *Notelæa* trees (29th July, 1924), two more emerged on the 20th October, six on the 23rd October, and eighteen on the 29th October. No fruit flies have to date emerged from this material.

(*Note.*—The discovery—originally made by Mr. H. Jarvis on information furnished by Mr. Townsend—not only indicated that fruit flies under certain circumstances might overwinter in the Granite Belt *in fruit;* but also, too, the very important role served by the native plant *Notelæa* in furnishing a breeding ground for fruit fly *Opius* parasites—thus the wisdom of encouraging the local growth of *Notelæa longifolia* to the fullest extent. It further—in connection with the entomologist's earlier introduction of the *Opius* fruit fly parasite into the Stanthorpe area, as set forth in a previous report . . . , the wisdom of the expedient, elsewhere mentioned by us, of securing the establishment there of other plants—bearing too small fruits—especially non esculent ones, in which not only the first appearing fruit flies in each season might lay their eggs, but in which (owing to the smallness of these fruits) the resulting maggots might serve for the parasite's natural increase; and so for the destruction by it of fruit fly maggots later on, when merchantable fruit occurred in the orchards—in fact to take the place of the coffee plant elsewhere where the *Opius* is used in fruit fly control.—Henry Tryon, Entomologist in Chief.)

B.—CODLING MOTH.

Codling Moth—Seasonal Occurrence.

The first hatchings of codling moth this season in the Insectary were on the 16th October; many of these were from second-crop apples secured last May. Daily hatchings have taken place since that date. It is rather remarkable that codling moth larvæ, developing in "second crop" apples, should mature and emerge as moths so early in the season.

A Parasite.—A very interesting parasite of the codling moth was brought to my notice on 24th October by Inspector F. Becker, who then submitted three parasitised codling moth chrysalises. One parasite had already emerged, and another could easily be seen inside the chrysalis, on holding it to the light, and this has subsequently emerged also. The parasite is a very interesting chalcid wasp of stout build, the hind femur being very much swollen—as in species of the type-genus Chalcis. It is black in colour, and is about three-sixteenths of an inch in length. These parasites have been forwarded to the Entomologist-in-Chief for identification.

C.—WOOLLY APHIS.

Woolly Aphis Parasite, *Aphelinus mali.*

This useful parasite of the woolly aphis—formerly imported from New Zealand—is now successfully established in this district and a fairly large supply is available for local distribution. Every effort will be made to establish a colony of these parasites, in at least one orchard, in every centre throughout the district this season.

On 9th September two specimens of *Aphelinus mali* emerged in the Insectary from material obtained last autumn.

On the 11th September, fifteen specimens of this insect were seen by Inspector F. Becker and myself on the nursery-tree in the Stanthorpe area. The tree at this

time was just beginning to sprout, but had no leaves, yet the parasite seemed to be quite at home and busy among the woolly aphis colonies. Additional supplies of woolly aphis were secured and transferred to this tree, and the parasites were left to work until 8th October, on which date eight were collected by Mr. F. Becker and thereupon liberated at Severnlea. During the catching of these insects Mr. Becker made some very interesting observations on the parasites' method of ovipositing. These observations are as follows:—

"The female *Aphelinus mali* approaches a colony of aphids and when close to them she turns round and backs into them. After first selecting one for oviposition, she scrapes the "wool" from its body by means of her strong hind legs (*i.e.*, last pair of legs); she then raises her abdomen, quickly stabs the aphis, at the same time inserting an egg in its body."

On the 13th October very large numbers of the parasite were observed on the tree crawling on the under surface of the leaves and amidst the colonies of woolly aphis, and it was thus realised that numbers could now be caught with safety for distribution elsewhere, as the parasite had evidently firmly established itself. Accordingly on the 22nd October, twenty-four parasites were secured and transferred to a tree at Dalveen, growing in the orchard of Mr. D. Stephens; this tree was screened from the wind and had on it a good supply of woolly aphis, and should make an ideal nursery for the parasite in the Dalveen district.

On the 27th October another twenty-four parasites were secured by Mr. Inspector Becker and taken to Ballandean, and liberated on a tree already prepared for them.

(*Note.*—I am indebted to the Chief Inspector, Mr. T. W. Lowry, for affording me occasionally the services of Inspector F. Becker for this work, and Mr. Becker has rendered me valuable assistance by his careful observation and quickness of eye and hand.)

Mr. Becker will have charge of the colony of *Aphelinus* at Ballandean, and should it become successfully established there, he will be able to distribute the parasites to orchardists who desire its introduction in the Ballandean *cum* Fletcher area.

D.—PEACH APHIS.

Black Aphis of the Peach.

These aphides (and also the green aphis species) have been exceedingly abundant this season; climatic conditions having evidently been favourable to their growth and development.

Both Black and Green Aphis have caused very considerable losses during recent months in relation to plum, peach, and nectarine trees. If neglected these pests will quickly destroy all chances of a fruit crop by seriously weakening the tree infested, and moreover causing all or nearly all of the young fruit to drop off.

Repeated sprayings with nicotine sulphate (Black Leaf 40) will keep these insects in check. The best results seem to be obtained by using soap as a spreader and giving one vigorous spraying, followed after a brief period (about three days) by another spraying. This procedure seems to be more effective than a succession of sprayings at intervals of ten or twelve days.

I am, again, indebted to Inspector F. Becker for bringing to my notice two parasites of the Black Aphis—one a Braconid wasp and the other a Chalcid fly. These have both been bred out in the Laboratory from material secured by Mr. Becker. I have not yet been successful in breeding *Aphelinus mali* from Black Peach Aphis, but I nevertheless consider that this little parasite may prove useful in checking this pest.

An experiment, to test the value of para-dichlorbenzol, as a soil-fumigant for Black Aphis on the roots of trees is now in progress. A small tin of this fumigant was recently received from Mr. W. Ranger, manager, Committee of Direction, Brisbane, and I am convinced that it will prove of great service for White Ants (Termites) in grape vine roots or in fruit trees; and perhaps for Woolly and Black Aphis on fruit-tree roots.

E.—SCALE INSECTS.

Scale Insect Predator.

On 16th September a useful insect was noticed at the Summit preying on Lecanium (berberidis). This insect—the larva or caterpillar of a small moth—completely devours the female scale insect, and finally turns to a chrysalis underneath the test or covering of the scale.

(*Note.*—Evidently a species of Eublemma (*Lep. Noctuidæ*) that under the name of *Thalpochares coccophaga* Meyr., was reported by us as controlling the Black Scale insect Lecanium (*Saissetia oleæ*)—Insect and Fungus Pests. Brisb. 1889, pp. 18 and 126.—H.T.)

Inspector St. J. Pratt also brought to my notice a moth larva of similar habits, that he found in large numbers associated with San José Scale Insect, and completely destroying it too. So numerous were the small cocoons of this insect, on one branch submitted to me by Mr. Pratt, that they almost entirely covered it. I have not so far been able to obtain the moth or final stage of this insect.

F.—DESTRUCTIVE BEETLES.

Apple Beetle *(Orthorhinus cylindrirostris).*

This weevil, sometimes known as "Elephant Beetle" is responsible for a good deal of damage to the smaller branches of apple-trees. Inspector E. Stephens, Dalveen, submitted specimens both of this beetle and also of the damage occasioned by it to the apple wood. The beetle is about five-eighths of an inch in length (just over half an inch), it is pale brown in colour, and is clothed with short hairs. It is remarkable for having the front pair of legs much longer than the second and third pairs, and also for its long trunk or snout, from which latter feature it gets is popular name of "Elephant Beetle." Its habit in relation to the apple is to gnaw the bark from the smaller branches to the depth of about one-thirty-second of an inch, sometimes continuing this right round the branch, and so ringing it. It does not confine its attention to the bark alone, but also attacks the young fruit, operating in a similar manner.

I have specimens of this insect from Applethorpe, where also it is mainly associated with the apple as above; but it has also been found in the larval condition boring in grape vine wood; and the adult beetle was reared in the Insectary from the specimens obtained thus in this association. I do not consider, however, it is likely to prove a pest; as, in respect to the apple, it can be easily controlled; and as regards its presence in grape vines, the instance referred to is the only one afforded by this district on record.

Wood Boring Beetle *(Xyloeborus solidus).*

This little wood-boring beetle has been recorded this season from various localities, and has been found "working" in plum, apricot, and apple-trees. Hitherto, I have only obtained records of its presence in apricot trees, but quite recently Inspector St. J. Pratt found it boring in plum trees, and Chief Inspector T. W. Lowry communicated its occurrence in apple-tree wood.

As I have before mentioned, in a previous report, this beetle is not responsible for the sickness of the tree on which it is found, for it only makes its appearance when a tree or branch is, from some cause or other, in a dying condition. Its presence in a branch can easily be detected by the small holes (about one-sixteenth inch in diameter) made by the beetles in entering or on emerging from the wood. The beetle is about a quarter inch in length, cylindrical in shape, and has the posterior portion of the body obliquely flattened, giving the insect somewhat the appearance of a small piece of stick pared abruptly off at one end.

G.—MISCELLANEOUS.

Plum Caterpillar.

A large noctuid caterpillar was found on 24th October, 1924, by Inspector T. Jardine attacking green plums in the Sugarloaf district, and doing a good deal of damage. The caterpillar is green in colour, and about two inches in length. An effort will be made to secure additional specimens from which the moth can be bred and so identified.

Fungus Diseases.

On 7th October the Government Entomologist and Plant Pathologist, Mr. H. Tryon, arrived in Stanthorpe to further investigate the occurrence of a serious "root disease" affecting apple trees. The following places were visited in his company:—The Summit, Applethorpe, Broadwater, Glen Aplin, Amiens, and Pozieres.

There are yet many serious and obscure fruit-tree troubles to be investigated here, and it is hoped, therefore, that the Government Pathologist will be able to pay a second visit of longer duration to the district.

Illustrations of various fungus troubles affecting fruit trees and grapes have been recently submitted to the Pathologist, and his reports on these diseases have been received and communicated to those in whose interests this was done.—H. Jarvis, 3rd November, 1924.

THE POULTRY TICK.

By P. RUMBALL, Poultry Instructor.

As the hot weather is here, poultry parasites will become more troublesome, the worst of which is the poultry tick. The tick already infests a large area of this State, and its further spread must be checked as a protection to the poultry industry. In town areas, the tick passes from one property to another by way of fences, boxes, old bags, and crates. A clean crate placed alongside an infested one, even for a night, is frequently the means of conveying the pest to clean districts. The purchase of new birds is also another channel by which this pest is transferred to other yards. I have even seen carts in the street infested with this parasite. Many excellent articles have been written on the subject, and it is not intended to go fully into the life and habits now. Briefly, the female tick lays eggs, sometimes on the bird, but more commonly in the cracks and crevices, to where they have retreated during the day. When the young is hatched, it has six legs, and is a light

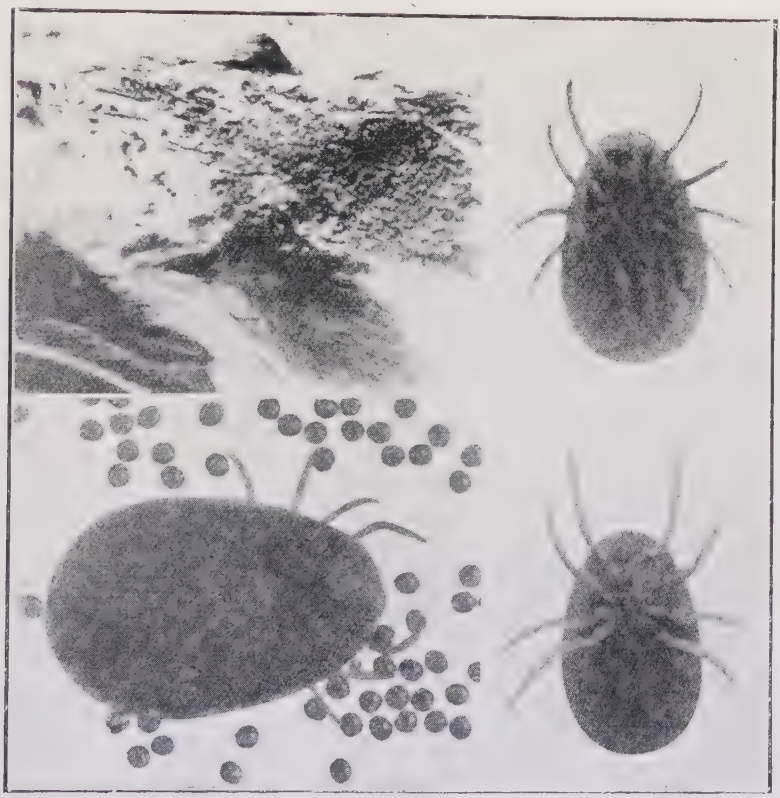


Plate 146.

Upper Left.—Larvæ of fowl tick under feathers of fowl.
Upper Right.—Unengorged male.
Lower Left.—Female with eggs.
Lower Right.—Unengorged female.

grey in colour. It attaches itself to the bird and remains the while feeding. When satisfied the tick leaves its host and retreats to some dark corner or crevice, where it digests its meal and sheds its skin. The newly moulted tick now has eight legs, and after a few days again attacks a host, feeds, seeks retreat, and again moults. This process is repeated until the tick is fully developed, and is sexually mature. Full-grown females are frequently the size of a finger nail. In searching for the tick insert into the crevice the blade of a pen knife, when their presence is revealed by blood on the blade or the dislodging of specimens. The presence of tick is also frequently indicated by the stains on the timber around their retreat. From the foregoing, it will be seen that during the day the adult tick is under cover principally

in the roosting quarters, cracks in the timber, nest boxes, old bags, or even between sheets of galvanised iron where it overlaps, and the young or seed tick is attached to the fowl. The effect of poultry tick on fowls is not confined to the loss of blood. The most serious effect of tick is caused by the transmission of an actual blood parasite. This parasite induces a fever which either causes the fowl to die or leaves it after a severe illness to recover and become immune to further attacks. This immunity frequently leads farmers to under-estimate the havoc that can be wrought by the poultry tick, and they become indifferent to their presence.

The symptoms of fowls suffering from tick fever are rise in temperature, listlessness, frequently a loss of appetite, restless and distressed, ruffled plumage, comb blackness and shrinkage, and some symptoms of paralysis. Diarrhœa is nearly always present, and owners frequently arrive at the conclusion that their birds are suffering from cholera. When these symptoms present themselves, a thorough search should be made for tick. Spraying and dipping are then a means of destroying these pests, but owing to the latter necessitating the catching and handling of the birds, it is not generally to be recommended, as anything of this nature is detrimental to egg production. The better method is to spray at intervals of, say, three days, until all the ticks are eradicated. Kerosene is the best and cheapest agent for the eradication of poultry tick. It is used in the form of an emulsion. Take 1 gallon of boiling water and dissolve in it 8 oz. of soft soap, remove from fire and stir in 1 gallon of kerosene; to this add 8 gallons of water and you then have a spray that will destroy ticks. It is imperative that soft water only be used in making this emulsion, otherwise the kerosene will separate from the water. All woodwork and crevices need to be done thoroughly, and it will be understood that any timber, wooden nest boxes, and harbour of such nature that are not necessary should be burnt. In the event of it being necessary to dip poultry, they could be dipped in the mixture, but care must be exercised to see that there is no free oil floating as it will scald the bird. A 2 per cent. formalin solution is recommended for dipping. It will be seen that the prevention of the spread of this pest, and also its eradication is in the hands of the producer. A farm free from tick may be kept so by the strict examination of all birds bought, and crates, egg boxes, &c., which are returned from market. It will also pay the farmer whose birds are infested to get to work and eradicate this pest; the cost is not great and the time involved would be amply repaid by additional returns.

PIG BREEDING.

ROOT CROPS FOR PIGS.

Pig foods of all descriptions have been very expensive for years past, and though quite recently in Queensland there has been an appreciable drop in the price of all concentrated feeding stuffs—pollard, barley meal, maize, wheat meal, &c.—and of other foods, the prospects of a continuance of low values for these foods and of regular supplies being available at these rates when required is not attractive enough nor is it desirable.

The secret of success in pig raising is the production of as much food as possible on the farms, consequently the subject of making suitable provision in the shape of quick-growing, heavy-yielding farm crops calls for careful consideration.

During a discussion recently upon the relative values and merits of artichokes and sweet potatoes as food for pigs, the question was asked as to whether an acre of artichokes would fatten more pigs than an acre of sweet potatoes. This is not an easy question to answer, for everything would depend upon the class of soil in which the crops were grown and upon climatic conditions, &c., as both crops are not equally suitable for all climates. Artichokes thrive in warm as well as in cold climates and give best results in a good mellow loam or on a soil in which the English potato flourishes, whilst the best crops of sweet potatoes are secured in the warmer sub-tropical climate where there is a more liberal rainfall and where the soil is light and of a sandy or loamy nature. In suitable soils an acre of sweet potatoes will provide more food than a similar area of artichokes.

For full details regarding the cultivation of the sweet potato, the most suitable varieties, &c., pig-breeders are referred to the pamphlet dealing with this subject issued by the Department of Agriculture and Stock, Brisbane.

There is this to be said in favour of sweet potatoes that the tops or vines may be fed to pigs, cows, or sheep, beneficially and safely, though there are some pig-breeders who aver that they have had pigs poisoned as a result of eating the vines of the sweet potato. The vines are in reality more nitrogenous (flesh forming) than

the tubers, and if the crop is fed off by the pigs being allowed to do their own harvesting they will benefit by eating both vines and tubers and in this way they would tend to balance their own ration, whereas if the vines were discarded in digging and the tubers only fed the same beneficial result would not accrue to either animal or owner. The [illegible] between the analyses of artichokes and sweet potatoes may be seen from the following table; that of the ordinary potato is given for comparison.

	Water.	Carbo-hydrates.	Protein.	Fat.	Ash.	Nutritive ratio.
Artichokes (tubers) ..	79·5	16·7	2·5	0·2	1·0	1 to 7
Sweet Potatoes (tubers) ..	71·1	24·7	1·5	0·4	1·0	1 to 17
Potatoes (Ordinary English tubers)	78·9	17·9	2·1	0·1	1·0	1 to 8·6

Plate 147.—Jerusalem or Globe Artichokes Yield an Abundant Crop of Succulent Nutritious Tubers much Appreciated by all Classes of Pigs.

The artichoke is in general the cheapest crop to produce; less labour is required in planting, but from 4 cwt. to 5 cwt. of seed per acre is needed, whereas the sweet potato is propagated by means of cuttings and to produce these "shoots" or cuttings less than 1 cwt. of sweet potatoes would be necessary.

In favourable localities the sweet potato is the most profitable, especially as, if carefully handled, it can be dug and stored much more satisfactorily than artichokes.

In each case, and especially in that of the artichokes, it must be remembered that the plant may become a "weed" and be difficult to eradicate; these crops should, therefore, be grown only on spare ground that has been thoroughly cleansed and prepared beforehand and on land that is not required immediately for the general rotation of crops grown on the farm.

Artichokes occupy the land continuously for several years and continue to "crop up" long after the main crop has been "turned in." Neither crop can be considered a complete ration for fattening purposes; to secure the best results they should be supplemented with lucerne, barley, maize, peas, or other crops, or with some grain concentrate and with skim milk.

Further reference will be made in future notes to mangels, sugar beets, peanuts, &c., and to the cultivation of the different varieties of artichokes, &c.—E. J. SHELTON, H.D.A., Instructor in Pig Raising.

THE NATIVE BRYONY *(Bryonia laciniosa)*

A POISONOUS PLANT.

By C. T. WHITE, Government Botanist.

Description.—A rather slender climber of the melon family. Stems smooth or somewhat prickly, with a number of short, sharp, prickles. Leaves very deeply lobed, somewhat variable in size, mostly about 3 in. across, the lobes mostly about 3 in. long and ¾ to 1 in. broad, but often larger. Flowers small, borne in clusters in the axils of the leaves, the male and female flowers often in the same cluster. Berries, globular about 1 in. in diameter, bright red, marked lengthwise with a number of wavy white lines.

Distribution.—Very common in the coastal "scrubs" (rain-forests) of Queensland and Northern New South Wales; also found in tropical Asia and tropical Africa.

Botanical Name.—*Bryonia,* the Greek and Latin name for the European Bryony; *laciniosa,* from the Latin *lacinia,* the lappet or flap of a garment; referring to the leaves being lobed.

Poisonous Properties.—Dr. A. H. Baldwin, Acting Director of the Australian Institute of Tropical Medicine, Townsville, under date 3rd September, 1924, wrote me:—

"I am forwarding by the same mail a small package containing the stalk and part of two berries of a plant which is reputed to have caused the death of two children in North Queensland. Unfortunately, owing to the small amount of the plant forwarded to us I am unable to supply you with more for your examination, but should you desire it, I will endeavour to get a further supply. It appears to be somewhat like the Japanese cucumber. At this Institute an emulsion was made of the berries, one part of berries to six of water. Seven c.c.s. of this emulsion was administered to a full-size female guinea pig with the following results:—

"At 10.15 a.m. 7 c.c.s. of emulsion was administered by a stomach tube.
10.25 a.m.—Temperature 102 degrees F.
11.25 a.m.—Temperature 97.2.
12.20 p.m.—Temperature 96.0.
2.0 p.m.—Temperature 97.3.

"The guinea pig at the present stage appears liable to die. Through the course of our observations, it has suffered from laboured breathing, obvious discomfort, twitching of the nostrils, hair standing on end, and on occasions a coarse convulsive movement of the hind legs. It would appear from this that there is some toxic substance present in the berries. I should be very glad if you could name the plant for me and also inform me if it is known, if a toxic principle be present, and what this is?"

The plant forwarded by Dr. Baldwin proved to be the native Bryony (*Bryonia laciniosa*). The fruits of this plant had previously been accused in Australia of causing the death of children who had eaten them. In the "New South Wales Agricultural Gazette for July, 1896 (Vol. VII., p. 424) J. H. Maiden recorded the death of a child at Boggumbil, New South Wales, due to eating the poisonous red

I. W. Helmsing, Del.]

PLATE 148.—THE NATIVE BRYONY (*Bryonia laciniosa*).

and white berries of this vine. The vine is very common in the coastal "scrubs" or "bushes" almost throughout Queensland, and therefore a warning regarding the plant is not out of place. It can very easily be told by its small melon-like fruits of a bright red colour marked with longitudinal white lines. Our plant is very closely allied to the common Bryony of Europe, which is well known as a poisonous plant. Cornevin (Des Plantes Veneneuses) intimated that fifteen berries would cause the death of a child and forty that of an adult. The poisonous principle is the glucoside "bryonin." This principle is also probably in the Australian plant. Both the European and Australian species (which extends to tropical Asia) are used medicinally in spite of their poisonous properties.

Under date 26th September, 1924, Dr. Baldwin further wrote:—

"I was very pleased to receive your memorandum of 23rd September, giving particulars about *Bryonia laciniosa*. From further experiments which we carried out we have come to the conclusion that there was definitely a poison present, and that this was in the nature of a glucoside. A rabbit was fed with 6½ grams of a warm watery extract, and died within twenty-four hours after having exhibited intestinal and meningitic symptoms, the latter consisting of twitchings and convulsions. On post-mortem the most noticeable features were, a rather intense irritation of the small intestine about 2 ft. below the stomach with pronounced engorgement of the mesenteric vessels; the stomach itself was not much affected; the brain showed fairly severe engorgement, but not definite hæmorrhage. A guinea pig allowed to eat a few grams of the berries and provided with no water survived, but a guinea pig fed with a warm watery extract died on the third day."

The symptoms described by Dr. Baldwin agree more or less with those described for the European species (*B. dioica*); of this latter species H. C. Long in his "Plants Poisonous to Live Stock" says: "The symptoms are those resulting from inflammation of the stomach together with convulsions. According to Cornevin consumption of the plant promotes sweating and causes a livid hue, nausea, diuresis, and abundant painless watery defæcation, to which are added in cases of poisoning nervous symptoms or stupor and tetanic convulsions. There may be super-purgation or a suppression of defæcation."

INTERSTATE POTATO SHIPMENTS.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) has made it clear that the Department has not been unmindful of the trouble due to the inability of growers and merchants to obtain new bags in which to ship potatoes to Sydney, in accordance with the regulation in force there. This regulation is consequent on a decision at the Agricultural Conference in 1921 to the effect that only new sacks are to be used for interstate trade. Though at that time it was a proper agreement to make, circumstances have altered, and there is a great shortage of new sacks, and in view of the present circumstances the Department has made a request that potatoes may be sent from here in clean, sound second-hand bags. This request was refused by the Department of Agriculture in New South Wales, and Mr. Gillies was so concerned about the obstacle to the interstate trade that he telegraphed personally to the Southern Minister asking him to reconsider his decision and permit the entry from Queensland of potatoes in clean and sound second-hand sacks, but without avail. This refusal is accentuated by the knowledge that, notwithstanding the agreement of 1921, Queensland has been permitting the entry of potatoes from New South Wales in second-hand sacks. There is, it is regretted, no reciprocation or co-operation on the part of New South Wales when there is a real reason for temporarily setting aside that agreement.

QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS, Assistant Botanist.

The pictures accompanying this article illustrate the lower part of the stem and flowering specimens of the Native Tamarind, *Diploglottis Cunninghamii*. This tree is a fairly conspicuous one on account of its very large, rusty, hairy leaves. The young shoots have a very dense, velvety coating of rust-coloured hairs. The yellow pulp of the fruit has a pleasant acid flavour, somewhat like that of the tamarind of commerce, and has been used for making a cordial. The ripe fruit is also sought after by pigs in the districts where the tree grows. The wood is pale yellow in colour and finely grained. The species has a fairly wide range in the coastal rain forests from Illawarra, New South Wales, to Cairns, North Queensland.

Photo. by A. H. Chisholm.]

Plate 149.—The Native Tamarind (*Diploglottis Cunninghamii*).
A tree in the National Park, Roberts' Plateau.

Photo.: Dept. of Agric. and Stock.]

PLATE 150.

THE NATIVE TAMARIND, SHOWING LEAVES AND FLOWERS.

EGG-LAYING COMPETITIONS.

N.U.P.B.A., ZILLMERE.

3,856 eggs were laid at the N.U.P.B.A. Competition, Zillmere, in the course of October, the average per bird being: White Leghorns 22.4, Black Orpingtons 20.5, and Other Varieties 20.5, while the average for the whole competition was 21.7. One death occurred, a White Leghorn No. 81 owned by Mr. J. Purnell. The following have been affected by broodiness:—109, 112, 116, 126, 129, 136, 137, 145.

WHITE LEGHORNS.

Pen No.	Owner.	Oct.	Total.
104	Oakleigh P. F.	29	182
21	Hodge, A.	27	161
97	Sommerlad, K. A.	25	158
20	Hodge, A.	25	156
105	Oakleigh P. F.	22	156
82	Wakefield, W.	25	154
84	Wakefield, W.	24	153
12	Berry, W. J.	29	149
95	Williams, G.	26	148
78	Newberry, M. F.	22	147
19	Hodge, A.	21	146
89	Duff, R.	26	146
6	Pember, H. T.	24	145
88	Duff, R.	26	145
79	Purnell, J. E. G.	26	141
90	Duff, R.	22	141
76	Newberry, M. F.	18	138
16	Webster, J. T.	24	137
101	Walters, A. S.	26	134
11	Berry, W. J.	27	132
25	Britten, H. T.	24	132
48	Turner, R. C. J.	21	132
41	Cole, R. C.	22	131
64	Tracey, E.	23	131
73	Raymond, E. C.	24	131
92	Hodgson, C. A.	24	131
100	Walters, A. S.	24	131
68	Kidd Bros.	21	130
174	Grenier, S. L.	25	128
61	Carinya P. F.	23	127
65	Tracey, E.	27	125
1	Williams, F. J.	23	124
39	Fraser, H.	23	124
46	Turner, R. C. J.	18	124
51	Earl, J.	27	123
56	Hutton, J.	25	123
58	Staib, A	22	123
80	Purnell, J. E. G.	25	123
15	Marks, G.	24	123
15	Marks, G.	24	122
103	Oakleigh P. F.	6	122
106	Howard, W. L.	25	122
40	Cole, R. C.	22	120
99	Sommerlad, K. A.	24	120
38	Fraser, H.	20	119
60	Staib, A.	14	119
74	Raymond, E. C.	23	118
44	Adams, P. F.	21	114
108	Howard, W. L.	24	114
87	Enroh Pens	23	113
93	Hodgson, C. A.	13	113
45	Adams, P. F.	23	112
98	Sommerlad, K. A.	23	111
10	Berry, W. J.	25	110
47	Turner, R. C. J.	21	103
86	Enroh Pens	18	103
69	Kidd Bros.	23	98
62	Carinya P. F.	22	97
63	Carinya P. F.	23	97
5	Pember, H. T.	25	96
59	Staib, A. (Replace, 13-6-24)	21	96
26	Britten, H. T.	20	92
34	Chapman, J. L.	27	92
172	Grenier, S. L.	26	92
91	Hodgson, C. A.	25	89
83	Wakefield, W.	17	87
107	Howard, W. L.	5	87
17	Webster, J. T.	0	21
50	Earl, J. (Replace, 6-10-24)	21	21
30	Campbell, M. H.	25	B148
71	Wilson, J. R.	27	B146
67	Kidd Bros.	21	B143
35	Chapman, J. L.	24	B140
52	Rogers, G. E.	23	B135
75	Raymond, E. C.	21	B134
28	Campbell, M. H.	22	B132
29	Campbell, M. H.	23	B132
14	Marks, G.	27	B130
42	Cole, R. C.	21	B128
49	Earl, J.	23	B128
72	Wilson, J. R.	23	B101
33	Hindes, W. and G. W.	23	B98
77	Newberry, M. F.	17	B97
24	Neil, A.	17	B84
173	Grenier, S. L.	21	B69
7	Sturman, H.	11	B49
70	Wilson, J. R.	27	BE156
55	Hutton, J.	26	BE154
86	Enroh Pens	18	BE123
66	Tracey, E.	25	BE148
31	Hindes, W. and G. W.	28	BE146
81	Purnell, J.	22	E142
102	Walters, A. S.	26	E142
54	Rogers, G. E.	24	E138
18	Webster, J. T.	26	BE135
27	Britten, H. T.	21	E133
53	Rogers, G. E.	27	E133
32	Hindes, W. and G. W.	20	BE130
36	Chapman, J. L.	22	E122
57	Hutton, J.	22	BE121
37	Fraser, H.	26	BE121
9	Sturman, H.	25	BE118
8	Sturman, H.	23	E115
2	Williams, F. J.	24	E113
22	Neil, A.	16	BE110
23	Neil, A.	20	BE110
96	Williams, G.	24	BE110
3	Williams, F. J.	23	E109
4	Pember, H. T.	22	E101

B Signifies bird under standard weight.
E Signifies egg under standard weight.

BLACK ORPINGTONS.

Pen No.	Owner.	Oct.	Total.	Pen No.	Owner.	Oct.	Total.
127	Walters, E.	25	177	112	Wilson, W. R. ..	19	115
156	Hutton, J.	28	173	134	Dennis, C. C. ..	20	114
126	Brotherton, T. ..	15	170	152	Enroh Pens	26	110
130	Rogers, G. E. ..	22	166	137	Adams, W. S. ..	8	105
110	Fanning, T.	21	159	141	Prdye, J. (Replace, 7-7-24)	22	75
111	Fanning, T.	26	156				
129	Walters, E.	20	156	118	Chaille, H. M. ..	8	73
144	Cummings, F. P. ..	22	155	121	Potter, J.	16	72
131	Rogers, G. E. ..	25	152	124	Brotherton, T. (Replace 30-8-24) ..	22	49
113	Wilson, W. R. ..	22	151				
143	Cummings, F. P. ..	22	151	119	Chaille, H. M. ..	25	B127
150	Raymond, E. C. ..	28	149	114	Wilson, W. R. ..	24	E177
116	Campbell, G. L. ..	14	148	142	Cummings, F. P. ..	27	E167
139	Prdye, J.	23	148	154	Hutton, J.	27	E162
155	Hutton, J.	23	148	138	Adams, W. S. ..	25	BE161
133	Dennis, C. C. ..	23	146	115	Campbell, G. L. ..	5	E143
120	Chaille, H. M. ..	23	134	123	Potter, J.	22	E143
153	Enroh Pens	22	131	117	Campbell, G. L. ..	9	E140
125	Brotherton, T. ..	19	128	140	Pryde, J.	28	E133
149	Raymond, E. C. ..	27	127	109	Fanning, T. ..	3	E130
145	Everlay P. Y. ..	12	125	136	Adams, W. S. ..	17	E128
128	Walters, E.	15	120	122	Potter, J.	18	E113
146	Everlay P. Y. ..	23	120	151	Enroh Pens	24	E109
132	Rogers, G. E. ..	19	119	135	Dennis, C. C. ..	21	E94
148	Raymond, E. C. ..	20	117				

OTHER VARIETIES.

159	Messines P. F. (R.I.R.)	27	138	178	Ferguson, J., and Sons (B.L.)	26	97
169	Pryde, J. (Lang.) ..	15	131	164	Walters, A. S. (B.R.)	16	85
161	Ollier, T. C. (B.R.)	26	123	176	Everlay P. Y. (B.L.)	17	75
160	Ollier, T. C. (B.R.)	23	121	163	Walters, A. S. (B.R.) (Replace, 3-7-24)	18	68
168	Forsyth, W. H. (S.W.)	20	118				
167	Forsyth, W. H. (S.W.)	17	114	170	Pryde, J. (Lang.) Replace, 23-6-24)	20	B89
180	Ferguson, J., and Sons (B.L.)	19	114	175	Everlay P. Y. (B.L.)	27	E133
165	Walters, A. S. (B.R.)	21	110	162	Ollier, T. C. (B.R.)	17	E109
157	Messines P. F. (R.I.R.)	25	108	171	Pryde, J. (Lang.) (Replace, 21-6-24)	19	E91
				177	Everlay P. Y. (B.L.)	18	E79
158	Messines P. F. (R.I.R.)	14	108	179	Ferguson, J., and Sons (B.L.)	24	E78
166	Forsyth, W. H. (S.W.)	21	105				

B Signifies bird under standard weight.
E Signifies egg under standard weight.

C. KIDD, Hon. Secretary.

N.U.P.B.A. TOOWOOMBA SUB-BRANCH.

BLACK ORPINGTONS.

Pen No.	Owner.	Oct.	Total.	Pen No.	Owner.	Oct.	Total.
51	*Holmes, R.	26	164	28	†Williams, W. D. ..	23	153
9	†Everlay Poultry Farm	21	161	23	Carr, T. J.	21	152
41	Wilson, W. R. ..	28	159	7	†*Adams, P. F. ..	29	151
45	Stephens, H. B. ..	23	159	29	*Adams, W. S. ..	19	151
52	Holmes, R.	21	158	20	Maund, Mrs. L. ..	20	149
2	Hutton, J.	16	158	40	Rogers, G. E. ..	25	146
42	*Wilson, W. R. ..	24	157	10	Everlay, P. Farm ..	25	145
24	*Carr, T. J.	25	157	15	Macfarlane, K. ..	20	142
5	†Walters, E.	28	153	22	*Walsh, H.	22	142

* Signifies bird laying under-weight eggs.
† Signifies bird not true to type.

Black Orpingtons—*continued.*

Pen No.	Owner.	Oct.	Total.	Pen No.	Owner.	Oct.	Total.
50	†Ollier, T. C.	24	140	1	†Hutton, J.	13	117
39	†Rogers, G. E.	23	139	37	Short, J. W.	23	115
32	Radford, G.	20	138	21	Walsh, H.	15	114
25	Stephens, Moss	28	137	44	Smith, E. R.	17	112
19	Maund, Mrs. L.	23	134	14	Burns, R.	22	106
30	Adams, W. S.	27	134	8	Adams, P. F.	26	99
43	Smith, E. R.	17	133	47	*Head, J.	18	98
49	*Ollier, T. C.	12	132	34	*Potter, J.	15	97
33	Potter, J.	1	131	31	*Radford, G.	2	94
6	†Walters, E.	21	128	38	Short, J. W.	20	93
13	Burns, R.	23	128	4	McLay, J. A.	16	90
36	Rivett, R. R.	23	126	26	Stephens, Moss	18	88
3	McLay, J. A.	7	123	18	Champion S. H. K.	22	81
11	†Webb, A. W.	0	122	35	Rivett, R. R.	7	67
48	Head, J.	27	122	17	*Champion, S. H. K.	1	41
27	†Williams, W. D.	19	121	12	Webb, A. W.	0	16
16	*Macfarlane, K.	28	118	46	Stephens, H. B.	1	1

Other Varieties.

70	*†Dibbs, H. (Lang.)	31	173	71	Brand, V. (R.I.R.)	21	111
60	Le Pla, A. W. (R.I.R.)	26	170	54	Warrian, C. G. (Rock.)	20	109
53	†Warrian, C. G. (Rock.)	29	163	69	Dibbs, H. (Lang.)	17	106
66	*Becker, W. (Lang.)	25	155	72	Brand, V. (R.I.R.)	21	81
57	*Maund, Mrs. L. (Col. W'dotte)	25	148	63	Rafter, J. J. (B.L.)	20	80
65	*Becker, W. (Lang.)	25	140	55	Carr, T. J. (S.W.)	15	76
59	Le Pla, A. W. (R.I.R.)	4	133	58	Maund, Mrs. L. (Col. W'dotte)	16	73
61	Harrington, J. (B.L.)	20	128	67	Everlay P. F. (B.L.)	23	67
68	Everlay P. F. (B.L.)	22	123	62	*Harrington, J. (B.L.) (Bird dead)	0	42
56	Carr, T. J. (S.W.)	14	121				
64	Rafter, J. J. (B.L.)	23	114				

White Leghorns.

132	*†Short, J. W.	26	181	117	Goggins, J.	23	130
112	*†Chapman, S.	26	169	86	Rivett, R. R.	25	129
114	Cole, R. C.	23	167	87	Warrian, C. G.	23	128
131	*Short, J. W.	26	166	97	Hunt, G.	20	128
105	Hutton, J.	24	163	103	*Fallon, P. J.	17	128
73	Dippel, D. H.	26	157	116	Taylor, J.	25	128
124	King, J. E.	25	157	99	*Newton, J. W.	22	127
110	*Enroh Pens	26	155	108	Adams, W. S.	22	127
121	Grant, W.	26	154	77	Howard, R. B.	19	125
91	Stilton, G.	25	152	128	Stilton, E. J.	23	124
111	Chapman, S.	25	151	130	*Manning, H. G.	28	122
122	Grant, W.	26	151	76	†Wilson, W.	22	121
74	Dippel, D. H.	20	149	81	Smith, E. R.	23	119
123	King, J. E.	27	148	120	Rogers, G. E.	26	119
106	*Hutton, J.	21	147	80	McBean, S.	24	117
118	Goggins, J.	27	147	107	Adams, P. F.	23	117
129	Manning, H. G.	24	145	104	*Fallon, P. J.	21	116
113	Cole, R. C.	27	144	83	Carinya P. Farm	25	115
88	*Warrian, C. G.	28	143	90	Ellis, L. E.	25	115
93	†Williams, D. W.	22	141	126	Maurer, G.	25	115
115	Taylor, J.	26	140	79	*McBean, S.	24	114
100	*Newton, J. W.	22	137	102	Turner, R. C. J.	24	113
125	*Maurer, G.	26	137	92	Stilton, G.	22	110
78	Howard, R. B.	11	136	127	†Stilton, E. J.	20	110
109	*Enroh Pens	25	135	84	Carinya P. Farm	23	109
85	Rivett, R. R.	25	134	89	Ellis, L. E.	25	103
101	Turner, R. C. J.	21	133	119	Rogers, G. E.	22	103
96	Adams, W. S.	27	131	94	Williams, D. W.	22	101
75	Wilson, W.	21	130	98	Hunt, G.	21	85
95	Adams, W. S.	24	130	82	Smith, E. R.	25	82

* Signifies bird laying under-weight eggs.
† Signifies bird not true to type.

JOSEPH GARNER, Government Supervisor.

MOUNT GRAVATT.

During October 5,885 eggs were laid, being an average of 21.8 eggs per bird. Many of the scores in section 2 are affected by birds being broody. At the time of writing Mr. Hutton's "B" hen has made an unbroken sequence of 96 eggs. Two deaths occurred. Following are the individual scores. "U" opposite the scores indicates that the eggs are under the standard or 24 oz. to the dozen.

SECTION 1.

LIGHT BREEDS.

Name.	Breed.	A.	B.	C.	D.	E.	F.	Total for Month	Grand Total.
W. and G. W. Hindes	White Leghorns ..	149	163	153	163	159	140	157	927U
W. H. Flowers ..	Do. ..	112	119	145	147	162	156	141	841U
H. Fraser	Do. ..	156	132	128	157	123	134	140	830
S. Grenier	Do. ..	122	127	155	136	129	140	149	821
Oakleigh P. Farm ..	Do. ..	117	154	125	127	146	147	122	816
John J. McLachlan	Do. ..	59	149	155	118	140	94	126	813
Mrs. L. Anderson ..	Do. ..	139	132	141	133	130	134	141	809U
R. C. J. Turner ..	Do. ..	145	148	120	139	103	154	154	809
T. H. Craig ..	Do. ..	130	139	134	148	100	153	149	804
H. T. Britten ..	Do. ..	153	151	88	128	68	127	122	793U
G. Marks	Do. ..	167	126	130	116	126	127	164	792
G. W. Cox	Do. ..	134	112	150	103	160	133	152	792
Mrs. R. E. Hodge ..	Do. ..	139	139	108	145	127	120	134	778
T. W. Honeywill ..	Do. ..	134	154	123	129	138	110	143	788
Kidd Bros.	Do. ..	145	149	98	143	124	129	136	788
J. E. G. Parnell ..	Do. ..	129	119	126	139	140	143	131	786
W. Wakefield ..	Do. ..	71	141	143	125	143	156	159	779
L. Bird	Do. ..	136	142	131	72	145	138	130	764U
A. Sterling	Anconas	116	122	145	132	105	125	111	745U
L. J. Silman ..	White Leghorns ..	141	135	127	111	120	99	138	735
W. D. Melrose ..	Do. ..	88	123	159	144	87	115	106	734U
A. Neil	Do. ..	144	138	128	135	61	120	124	726U
B. Driver	Do. ..	115	100	99	154	137	116	152	721
H. P. Clarke ..	Do. ..	110	102	121	134	120	104	135	689
T. W. Biddulph ..	Do. ..	150	136	80	125	92	104	115	687
W. D. McHardie ..	Anconas	121	112	98	119	119	117	136	686
J. W. Newton ..	White Leghorns ..	127	112	104	94	120	118	128	675
Chris. A. Goos ..	Do. ..	6	153	104	103	139	132	100	637U
George Williams ..	Do. ..	123	40	123	122	117	107	123	632
Ancona Club (pen 2)	Do. ..	107	103	69	74	104	92	102	549
Ancona Club (pen 1)	Do. ..	71	111	100	130	73	17	79	502

SECTION 2.

HEAVY BREEDS.

James Hutton ..	Black Orpingtons ..	153	184	159	131	138	147	147	912
James Potter ..	Do. ..	142	162	134	112	159	122	120	830U
Carinya Poultry Farm	Do. ..	121	99	146	133	136	146	131	781U
E. Walters	Do. ..	76	104	119	166	176	125	119	771
R. Burns	Do. ..	134	125	128	126	112	129	147	754
Mrs. A. E. Gallagher	Do. ..	110	149	115	120	124	122	151	740
Kidd Bros	Do. ..	124	107	124	127	142	99	121	723
W. and G. W. Hindes	Do. ..	113	91	129	118	156	110	87	717U
H. G. Stephens ..	Do. ..	123	129	111	109	111	119	152	702
F. W. Lenny ..	Do. ..	133	90	144	91	91	133	130	682U
Mrs. A. Kent ..	Do. ..	133	152	74	96	83	117	121	655
H. M. Chaille ..	Do. ..	105	117	133	104	147	35	109	641U
J. Ferguson	Do. ..	52	99	125	118	112	127	115	633
E. C. Stead	Wyandottes ..	61	129	83	109	83	94	136	559U

P. RUMBALL, Supervisor.

Following is the weight of eggs of each individual bird and the general average per dozen for each respective pen. These eggs were weighed in the presence of the honorary committee and to the nearest hundredth part of an ounce.

SECTION I.

Name.	A.	B.	C.	D.	E.	F.	Pen.
Mrs. R. E. Hodge ..	2·24	2·44	2·18	2·23	2·24	2·29	27·24
T. H. Craig	2·15	2·15	2·11	2·15	2·25	2·02	25·66
D. H. Flowers	1·94	2·13	2·06	2·01	1·75	2·05	23·88
T. W. Honeywill	2·29	2·00	2·27	2·17	2·05	2·13	25·82
J. E. G. Parnell	1·91	2·13	2·15	2·11	1·92	2·05	24·54
W. D. Melrose	1·87	2·0	1·96	2·09	1·59	2·13	23·28
Kidd Bros.	2·12	2·12	2·01	2·17	1·79	2·18	24·69
H. P. Clarke	2·10	2·01	2·16	2·18	2·07	2·29	25·62
G. Marks	1·92	2·25	2·03	2·12	2·08	2·07	24·94
Ancona (Club 1)	2·05	2·10	2·24	2·13	1·94	2·13	25·18
G. W. Cox	1·87	2·09	2·27	2·13	2·09	1·99	24·78
S. Grenier	2·01	1·96	2·17	2·14	1·99	2·29	25·12
D. and G. W. Hindes ..	1·80	1·95	1·85	1·90	2·05	1·97	23·04
J. W. Newton	2·12	1.94	2·15	2·10	2·09	1·94	24 68
Geo. Williams	2·17	..	2·05	2·36	2·24	1·99	25·92
Mrs. L. Anderson	2·18	2·07	1·91	1·89	1·76	1·97	23·56
L. J. Silman	2·14	2·10	2·06	2·02	2·0	2·19	25·01
Chris. A. Goos	..	2·09	1·75	1·92	1·91	2·12	23·52
Oakleigh Poultry Farm ..	2·18	2·01	1·98	2·03	2·01	1·97	24·36
John L. McLachlan ..	2·02	1·95	2·25	2·07	2·08	2·06	24·86
L. Bird	1·61	1·88	2·07	1·71	2·10	1·79	22·32
A. A. Stirling	1·97	1·88	1·86	2·05	2·12	1·92	23·60
W. D. McHardie	2·17	2·11	2·17	2·25	2·12	2·17	25·98
Ancona Club	1·99	1·90	2·27	1·96	2·27	1·92	24·62
H. Fraser	2·00	1·90	2·08	1·91	2·28	2·22	24·78
H. T. Britten	1 93	1·87	1·96	1·95	2·06	1·75	23·04
A. Neil	1·99	1·99	2·05	2·04	1·72	2·03	23·64
B. Driver	2·39	1·94	2·02	1·94	2·29	2·10	25·36
T. W. Biddulph	2·21	2·11	2 29	2·29	2·26	2·07	26·46
R. C. J. Turner	2·22	2·20	2·33	2·32	2·16	2·24	26·94
W. Wakefield	2·06	1·83	2·07	1·95	2·19	2·02	24·24

SECTION II.

Name.	A.	B.	C.	D.	E.	F.	Pen Average per Doz. Eggs.
E. C. Stead	1·94	1·93	1·88	1·86	1·81	1·82	22·48
Carinya Poultry Farm ..	1·87	2·00	2·12	1·98	1·92	1·98	23·74
Mrs. A. E. Gallagher ..	1·98	1·88	2·06	1·87	2·16	2·18	24·26
R. Burns	2·00	2·09	2·03	2·22	2·47	2·10	25·82
H. G. Stevens	1·97	2·28	2·03	2·01	2·15	2·03	24·94
J. Ferguson	2·41	2·23	2·54	1·97	2·04	2·26	26·9
Mrs. A. Kent	2·40	1·95	1·93	2·03	2·17	1·89	24·74
J. Potter	1·80	2·01	1·81	1·92	2·14	1·98	23·32
H. M. Chaille	1·93	2·18	1·90	1·83	1·99	1·99	23·64
E. Walters	2·07	1·99	2·02	2·13	1·85	2·20	24·52
W. and G. W. Hindes ..	1·75	1·90	1·98	1·97	2·04	1·75	22·78
James Hutton	2·16	2·14	2·24	2·08	2·22	2·29	26·26
Kidd Bros.	1·83	1·95	2·16	2·32	1·96	2·35	25·14
T. W. Lenny	1·82	2·32	2·17	1·63	1·98	1·75	23·34

From the foregoing figures it will be seen that there are 58 birds, or 31 per cent. in Section 1 which do not lay eggs of the standard weight, and in Section 2

41 birds, or 48 per cent. The 2-oz. egg is the universal standard adopted by Australian egg-laying tests and it would be very unwise to depart from this standard. If the results are analysed it will be seen that the average number of eggs from birds laying a standard egg is more than those laying undersized eggs, proving that it is not necessary to have a small egg in all cases to obtain the numbers.

The commercial value of the egg has also to be considered, as, on an average, there is about 2d. per dozen in favour of the first-grade egg. With an average in the test of 15 dozen eggs per bird, there will be a loss of £12 7s. 6d. due to undersized eggs. Apart from this loss, it is a well-known fact that in the flush season it is frequently difficult to dispose of undersized eggs, and if overseas marketing is to be a successful feature in the poultry industry, it is the 2-oz. egg that will assist to this end.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1924 AND 1923, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1924.	Oct., 1923.
North Coast.	In.		In.	In.
Atherton	0·96	23	1·02	0·47
Cairns	1·95	42	0·58	...
Cardwell	2·04	52	1·19	...
Cooktown	1·10	48	0·58	0·01
Herberton	0·94	37	0·70	0·18
Ingham	1·63	32	1·75	0·02
Innisfail	2 97	43	0·86	...
Mossman	3·00	15	0·62	...
Townsville	1·27	53	3·09	...
Central Coast.				
Ayr	0·99	37	3·00	0·02
Bowen	1·04	53	3·96	...
Charters Towers ..	0 69	42	1·46	0·01
Mackay	1·84	53	0·42	0·10
Proserpine	1·72	21	5 58	...
St. Lawrence ...	1·81	53	1 66	...
South Coast.				
Biggenden	2·18	25	6·48	0·51
Bundaberg	2·06	41	1·75	0·34
Brisbane	2·57	73	1·63	0·45
Childers	2·34	29	7·34	0·71
Crohamhurst ...	3·61	30	6·34	0·93
Esk	2·46	37	2·76	1·00
Gayndah	2·36	53	4·96	1·63
Gympie	2·68	54	5·11	0·76
Glasshouse Mts. ...	2·63	16	...	0·16
Kilkivan	2·57	45	5·49	0·79
Maryborough ...	2·66	53	4·27	0·92

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1924.	Oct., 1923.
South Coast—continued:	In.		In.	In.
Nambour	2·98	28	5·24	1·13
Nanango	2·27	42	7·01	1·39
Rockhampton ...	1·87	37	1·84	0·11
Woodford	2·54	37	5·54	0·91
Darling Downs.				
Dalby	2 07	54	2·59	0·73
Emu Vale	2·21	28	2·39	0·46
Jimbour	1·85	36	4·10	1·64
Miles	1·95	39	6·24	0·97
Stanthorpe ...	2·58	51	4·37	1·14
Toowoomba ...	2·62	52	2·12	1·98
Warwick	2·33	59	2·38	1·71
Maranoa.				
Roma	1·76	50	4·20	0·80
State Farms, &c.				
Bungeworgorai ...	1·34	10	4·61	0·71
Gatton College ...	2·14	25	1·70	0·21
Gindie	1·39	25	3·36	0·65
Hermitage ...	1·94	18	2·42	1·36
Kairi	1·19	10	...	0·36
Sugar Experiment Station, Mackay	1·64	27	...	0 08
Warren	2·16	10	3·48	0 06

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October, 1924, and for the same period of 1923, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

SWEET POTATOES.

CULTURAL NOTES.

Climate and Soil.

Sweet potatoes thrive best in tropical and sub-tropical localities, but can also be successfully grown in warm temperate districts. Soils most suitable are naturally well-drained, "free working," deep sandy loams, alluvials, and scrub soils, all containing a good supply of humus. Good crops may also be raised on moderately fertile sandy soils.

Where the soil is lacking in plant food and organic matter, well-rotted farmyard manure, supplemented with superphosphate and potash, should be turned in when cross-ploughing. Sweet potatoes should follow cowpeas in a rotation in preference to any gross feeding and strongly rooted crop like sorghum.

Preparation.

Soil preparation must commence some months prior to the planting season. At least two ploughings are required, the second the deeper of the two, say, up to 9 or 12 in., according to circumstances.

Subsequent cultivation to conserve soil moisture, kill weeds, and improve tilth should not exceed 4 in.

Raising the Crop.

Early planting—by means of "shoots" raised direct from tubers—is conducive to heavy yields. For this purpose, sound matured tubers of reputable quality, and of highly productive cropping capacity, should be selected; and the young plants or "shoots" grown according to directions.

A succession of these "shoots" is required for early mid-season planting. Later requirements in this direction are ordinarily obtainable from cuttings (10 to 12 in. long) of growing vines.

Planting.

In localities where frost is not prevalent, planting may commence in August and be carried on, according to circumstances, right into January.

One of two methods is customarily adopted:—

The first is to deeply dibble in "shoots" or cuttings 2 ft. apart along lines marked out 3 ft. apart for the purpose, and compressing the soil firmly with a spade against each shoot as it is planted.

The second is to lay the "shoots" down on the right-hand side of every fourth furrow and cover with the plough to within an 1 in. or 2 in. of the terminal bud, or, as an alternative, use a double-breasted plough for opening drills for planting and covering similarly.

Firming of the shoot in the soil is accomplished by the planter's boot when following up the ploughman, or by promptly rolling the surface of the ground.

Cultivation of Crop.

Start the cultivator as soon as the young plants show signs of having "taken," and continue the cultivation of the crop at intervals of about every week or ten days, gradually working the earth up well round the base of each plant until "hilled."

Five or six cultivations should be given. If a fall of rain occurs during the early growth of the crop, set the cultivator going as soon as conditions permit.

Ripeness of Tubers.

To ascertain whether tubers have reached maturity, cut or break the surface of one. If mature, a white crust will form on the exposed part, due to the crystallisation of the latex or milk-like juice of the tuber. When immature, the exposed surface rapidly becomes black.

Harvesting.

Tubers should be harvested during dry weather; and, to facilitate the operation, the vines should be cut, using either a scythe or sickle for the purpose. The tubers are subsequently lifted, either with the digging-fork or plough, and, when thoroughly dry, carted to the store or barn.

Storing.

When it is required to keep tubers for any length of time, select a well-drained, dry situation under a shed or barn. Put down a layer of dry sand, and place thereon a layer of tubers, care being taken to see that nothing but sound tubers are used, all those showing signs of damage by cuts or breakage being discarded. Spread sand over the layer, and fill up all interstices. Repeat the process *ad lib.*, and afterwards cover over with a thick covering of straw or bush hay.

HOW TO MAKE A PIG NET.

The method of making a pig net such as is illustrated herewith is extremely simple, and I have known persons to learn it in five minutes (writes Mr. W. J. Sheehan in the "Weekly Times"). All that is required is the rope and a piece of softwood or hardwood board, 12 or 18 in. long, rounded at the edges and the same width at both ends. This board is called the mesh stick, and is used to keep all the meshes the same size. A mesh stick 2 in. wide will make a 4-in. mesh; the rule is to have a stick half the width of the determined mesh. To measure the width of the meshes, pull them out to a diamond shape. The size of the mesh is left to the judgment of the person making the net. Instead of using a needle as the fisherman do, the rope may be rolled up in the same way as the ordinary clothes line. It can then be passed through the loops when making the knots easily and rapidly.

At one end of the rope to be used for making the net, tie a loop (A, Fig. 1), and place the knot on a strong spike or hook, attached to a post or wall or other convenient place, as at A, Fig. 2. Place the mesh stick or piece of board under the loop as at B, put the rope around the mesh stick, then pass the rope through the loop and pull the rope tight. Now, place the thumb of the left hand on the rope beyond the loop, at at A, Fig. 3, and with a turn of the wrist of the right hand, throw the rope to the position shown at B. Next, pass the rope behind the loop C, and then through the bight of B and down as at D; draw tight the knot, which should assume the shape indicated in Fig. 4. This figure shows the knot made loosely to enable the method of making it to be seen and easily understood. The rope must be held firmly with the thumb at A, Fig. 3, when pulling up the knot, as on this depends the uniformity of the meshes. To continue the netting, the stick is withdrawn and placed under A, Fig. 4. The rope is then passed around the stick, as in Fig. 2, and brought through the loop A, Fig. 4, and the process shown by Fig. 5 is repeated to form another mesh, this being continued to make a chain of meshes, say, the width of the farm dray or wagon in which the pigs are to be conveyed.

The loop A, Figs. 1, 2, and 5, first tied, is then untied, and it will be found that all the meshes are equal in size. Next, the chain of meshes is opened out at right angles to the line in which it was made, as shown in Fig. 6. In other words, remove the chain of meshes from a vertical position as in Fig. 5 and place them in a horizontal position as in Fig. 6. A line is run through the meshes D, E, F, G, and secured between two posts to hold the net while continuing the meshing.

Working across is then begun by making a mesh at A, Fig. 6, then at B, C. and so on, until the length of the first lot of meshes has been reached, when the right-hand side of the net is turned around and placed where the left-hand side was, and the left-hand side placed where the right-hand side was. Another row of meshes is started on the left-hand side (facing the net), and worked until the one under A has been reached on the right-hand side.

The net is then turned again, and another row of meshes commenced on the left-hand side, and so on until there are enough rows of meshes to cover the dray.

To secure the net to the vehicle, use rope plough reins, and reeve them through each mesh and around the side and end rails of the dray. The methods described above of making the meshes is the same as is used in making ordinary hammocks.

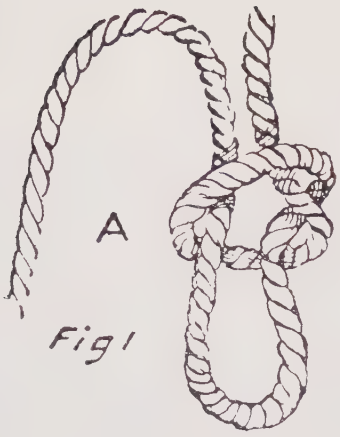


Fig 1

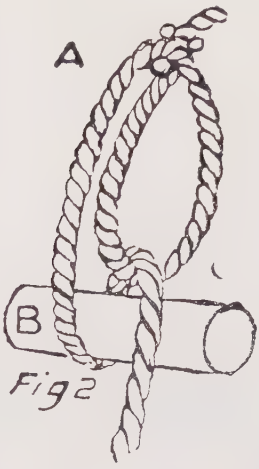


Fig 2

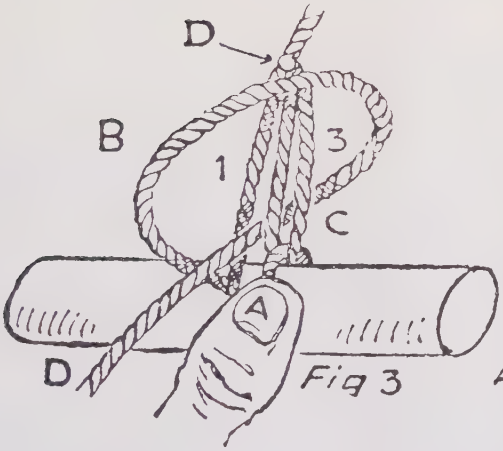


Fig 3

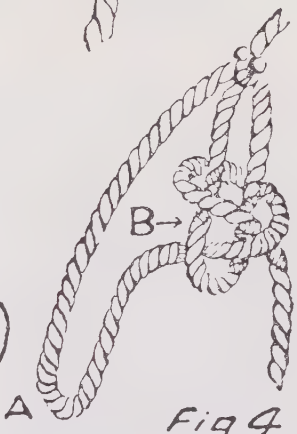


Fig 4

Fig 5

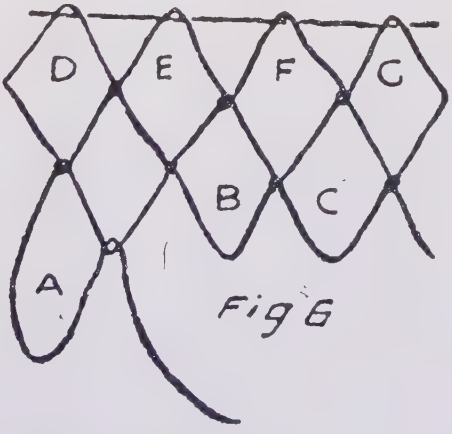


Fig 6

RURAL HYGIENE.

By W. H. READ, M.B., Ch.M. (Syd.), D.P.H. (Camb.).*

When we think of the wealth which comes to Australia from our wool and wheat, cattle and timber lands, and then ponder the isolation, heat, dust, and lack of ordinary comforts which settlers in the out-back put up with to help gather in our primary products, it must be admitted that we are under a great debt to these people, and it is up to us to help make their lot a healthier and a happier one.

City's Care.

In the city, in most matters of hygiene, others do the thinking for us. We have our health medical officers, our trained sanitary inspectors, our health societies—an evergrowing group of officials, investigators, and workmen collectively known as the sanitary authorities. These men are constantly at work and it is chiefly due to their labours that great epidemics are prevented. When their work is successful, nothing amiss happens, and the average citizen is unconscious of the fact that his health and perhaps his life have been in jeopardy.

When they fail, illness and death settle upon the community. Quick to seize upon every new fact in science, and calling to their assistance the best brains among doctors and engineers, these men have formulated a code of regulations for the preservation of the public health, the evasion of which is regarded as a criminal action for which the culprit is held responsible.

Country is Different.

In the country, at the present time, every person or family must of necessity, from a hygienic point of view, be a law unto himself or themselves. They, of course, enjoy one privilege, that is the advantage of dilution of population, so important a factor in the prevention of the spread of communicable disease. At the same time their very isolation prevents them from enjoying the advantage of such general utilities as the installation of a good public water supply, a complete and effective sewage system, an organised scavenging system, electric lighting, and other sanitary measures which are possible in an urban community.

The prevalent opinion is that a farm is a healthy place to live on, and so it should be. As an actual fact, however, owing to neglect of simple common sense, inexpensive and elementary observances of sanitation, persons living on farms are exposed to conditions dangerous to health to a greater extent than people living in a city. Thus the risk of typhoid fever in a modern city with a good water supply and modern water carriage system of sewage disposal is infinitely less than that on the average farm.

His work in the open-air and natural mode of life make the rural dweller one of the longest lived of the classes into which the community is divided, but in many cases his chances of long life are much reduced by inattention to the sanitary condition of his home and surroundings.

In a way he is not to be blamed—he is unfamiliar with such matters—he is fairly scared of the word "hygiene," and how often does the unknown, when unexplained, strike terror to the human soul?

Ancient and Modern.

To the ancients, the unexplored ocean beyond those horizons they were accustomed to see, was filled with chimerical monsters and verged upon a terrible abyss into which too venturesome ships must fall. We have learned that the earth is a sphere, the seas have been explored, the abyss has disappeared, the terrors have been dissipated. Though occasional accidents befall they are recognised to be the results of natural causes and no mariner now fears to navigate the globe.

To many primitive peoples the mountains were the abode of the gods, or were haunted by evil spirits and were taboo; civilised man having ascended nearly all of their highest ranges has found them to be but irregularities of the earth's surface. Upon them accidents occasionally happen, but always from natural causes, and no one hesitates to climb.

So it is with the average country dweller and his conception of hygiene. His occupation takes up so much of his time that he has seldom leisure to consider the importance of healthy conditions necessary for human beings. Once he has properly

* From a lecture delivered on behalf of the Public Health Association of Australasia, before the Cumberland Branch of the Country Women's Association.

grasped the elementary principles of sanitation, he will be convinced that their practical application is a proposition that will pay, and that what was good enough for his father is not necessarily good enough for him.

What are these elementary principles and how can the farmer be taught them?

It would be impossible in a cursory paper like this to discuss these important matters in any detail. It is proposed therefore to do little more than touch upon a few of the things that a farmer should know about, and first as to the construction of his home.

There is a very definite relation existing between the manner of construction of the house and the health of its inmates. Health is more readily preserved in a house situated in the country surrounded by an unoccupied open space, than in one placed in a town surrounded by occupied houses, the smoke of whose chimneys taints the air, while the earth becomes impregnated with the accumulated filth of many a generation.

The rural dweller is certainly fortunate in escaping one of the greatest curses of urbanisation, that everlasting black pall of smoke which overhangs our cities and industrial areas and deprives us of a big percentage of available sunlight.

Health is affected by the soil on which the house stands, and by its immediate surroundings of hill and vegetation.

The wise man who we are told built his house upon the rock was only considering its stability; but we, in our generation have to think of the effect on health of the soil on which the house is erected as well as to consider how long the house will last.

Most Satisfactory Site.

As a general rule the most satisfactory site for a house is a moderately elevated one protected from westerly winds and having a good exposure to the sun from the other three points of the compass. It is desirable, if possible, that the direct rays of the sun should come into each room for some part of the day. There is no better disinfectant than bright sunlight, and we all know the stuffy smell of a room which has been shut up and kept dark for some time.

High-lying ground gives the advantage of free movement of air, and consequent freshness—in deep hollows the air stagnates. The surface of the ground should have a reasonable slope for drainage, and the soil and subsoil should be of a porous nature to prevent the stagnation of water on the surface or immediately below.

Certain subsoils, such as rocks or gravel, allow water to soak through easily, and thus quickly become dry after rain; others, like clay, prevent this percolation, and retain the water on their surface, being consequently damp soils.

A pervious soil is to be preferred to one which is impervious, gravel is thus more healthy than clay. There may be a thin layer of some permeable soil covering clay or other impermeable subsoil; the water does not then remain visible but is yet retained near the surface and renders the ground damp.

Concrete.

If there is no choice and the site is a damp one, the subsoil must be drained by suitable earthenware pipes which should be kept separate from the drains for waste waters, and the surface of the site should be covered with an impervious layer of concrete which should extend beyond the limits of the house itself.

Indeed, in a country like this, where so much damage is done by white ants, it is a question whether it would not be economical to have this concreting of the site done with every habitation. Where a hollow has been filled in with rubbish it is unfit for building upon until sufficient time has elapsed for all organic matter to be thoroughly destroyed, otherwise the gases of putrefaction may rise into the house and render it unhealthy.

Ventilation.

If the house is built of bricks it must be remembered that these will absorb moisture from the soil unless a damp-proof course is inserted in the brickwork above the ground level. The plates and joists which support the floor should be fixed above this damp-proof course, otherwise the moisture will reach the woodwork.

Since we know that the mortality from contagious diseases increases in proportion to the number of inmates of the rooms, hygiene requires that even the most modest dwellings should afford sufficient room to prevent over-crowding, and there should always be adequate provision for free ventilation.

Kitchen.

The kitchen is a place which should never be forgotten. Where it can be thoroughly separated from the rest of the dwelling this should be done; but under any circumstances the free ventilation of the space intervening between the two should be effected. This prevents the smell of cooking from pervading the whole dwelling, and also stops overheating of the rest of the house.

Every precaution should be taken to prevent the access of flies to the kitchen and pantry. Fly-proof doors and windows should be provided, and fly-papers to deal with any flies that may gain an entrance in spite of the precaution taken to exclude them.

Beware of the Fly.

The filthy but festive fly has a splendid scope for its activities in most rural homes. It plays such an important part in the country home that it may be of advantage to digress for a moment and give a short account of its life history. The female house fly, during her life of five to seven weeks, lays about 500 eggs. These are deposited in moist fermentable material—horse manure, human fæces, or ordinary refuse. They hatch out within 24 hours, into small white maggots, which crawl about and feed near the surface of the heap.

These maggots are full-grown in two to eight days, when they go into a pupal stage, looking like little, brown, seed-like bodies. In this stage they undergo a further transformation, and in two to eight days the young fly emerges. This dangerous insect has the disgusting habit of first frequenting the privy and then at the ringing of the dinner bell coming to the table without taking the trouble to wipe its feet.

It comes soiled with all the micro organisms that have been picked up in the course of its unsavoury peregrinations, among which may be those of typhoid fever, paratyphoid fever and dysentry. These it does not hesitate to scatter over the sponge-cake and preserves, which strongly attract it, and thus it may happen that with his desert the poor farmer unexpectedly swallows a dose of virulent poison. He must learn not to expose articles of food in such a manner that flies can soil them—he must learn not to tolerate flies in his kitchen or dining room.

Milk.

It should be remembered that many diseases are carried by milk, and, seeing that it is the chief source of nourishment for young children and the most delicate of all foods, every precaution should be taken to prevent its contamination.

It is fitting that this matter of milk should be mentioned in this connection because the dairyman is a rural worker, and because there is probably no article of food that is produced under filthier conditions than is milk. The dairyman must be taught what true surgical cleanliness is and he must learn to practise it.

It is not only the dairyman but also every householder who must try to check the growth of germs in milk and prevent the introduction of more. Clean vessels must always be used for its storage; if rusty or chipped vessels are used it is impossible to clean the germs from them, the result is that the milk will go sour.

It should be stored in a cool, shady place, because souring germs will not grow in cold milk. The vessels should be kept covered to prevent the access of flies which are one of the readiest means of spreading disease. The milk-can should be rinsed in cold water before washing, if hot water is used it will set a film of milk on the sides.

In washing the can use warm water and soda, this is the only safe way to properly clean it from all grease and dirt. Subsequent scalding with boiling water will kill all disease germs. After scalding, the can should not be dried with a cloth because this will introduce germs and undo the good of the scalding.

Keep Milk Cold.

As germs will not grow in cold milk, keep it as cold as possible; failing an ice chest, a simple cooler can be made from a kerosene tin in the following way:—

Cut out the four sides, leaving the angle corners as pillars, obtain 2¼ yards of towelling 18 inches wide, and run a draw-string along one edge—wring out the towelling in cold water and put it around the tin, using the string to draw it into position on top. Place a basin on top full of water, and hang strips of towelling from this to the sides of the cooler in order to keep the sides wet. Hang the cooler in the open in a shady and draughty place.

It is a safe rule always to pasteurise the milk, even when it comes from your own cows, unless they have been tested and proved to be free from tuberculosis. Stand the vessel containing the milk in a saucepan with water as high as the milk, bring the milk to the boil and immediately take it off the fire and stand in running water to cool it. Then put it in the ice-chest or cool box, but not in a closed cupboard.

FLUSHING THE BREEDING SOW.

In perusing the pages of several of the older established text-books on "Animal Husbandry" one frequently comes across the term "flushing" as applied to "flushing the mare" or the ewe or the sow or cow or as the case may be, in each instance prior to the time the female is mated.

This "flushing" is not a common term in Australian live stock literature nor is it a regular practice on our farms, consequently an explanation of the term "flushing the sow" before mating will be of interest to readers of this Journal.

The term flushing simply means a general stimulation of the whole of the internal organisation of the animal, the object being to increase the number of pigs produced at farrowing time. The purpose is accomplished by increased feeding of grain or by the use of fresh or more succulent pastures than have previously been available.

The practice is understood and practised more by the sheep man than by the breeder of pigs or of most of the other classes of live stock; still it is a well recognised old time as well as modern practice. The sheep man follows it by turning the breeding ewes into a fresh succulent pasture just prior to "joining the rams," the time when the ewes are to be mated, the objective here being to secure a larger percentage of twins or a higher general average at lambing time.

There is no reason why the pig breeder should not adopt the same practice with his breeding sows, especially with sows that are advancing in age and that might otherwise produce rather unsatisfactory litters.

The most beneficial results are obtained when the flushing begins two or three weeks before the breeding season opens. Supposing that the sows have been running on pasture alone during the greater part of the "off" season; at the beginning of the breeding season or when the sows are about to be mated they should be turned into a fresh patch of rape, lucerne, or other green stuff that would furnish an abundance of the most succulent forage.

In the case of a single sow, the breeder might begin by feeding a slop composed of milk and pollard or wheat or maize meal, &c., and give more than the usual supply of green food. The idea is to stimulate the whole system without putting on any great amount of fat. It is, of course, expected that the animals will begin to gain a little more rapidly in early spring or as the breeding season opens, and the majority of breeders will see to it that their stock put on flesh at this time, but it is important that the sows should be in the medium breeding condition and be gaining in weight and flesh at the time when they are mated. After the sow has been mated, continue the practice for a week or two before turning her out to pasture again.

All sows should, of course, be kept in good breeding condition during the gestation period, but there is no necessity that they should be "rolling" in fat.—E. J. SHELTON, Instructor in Pig Raising.

Thirty-seven per cent. of the world's supply of pork (not including China) is produced in the United States. Australasia supplies only a negligible amount.

Our grandfathers would turn over in their graves if they heard of the methods followed in forcing and fattening pigs nowadays. Let the hog harvest his own corn; this is the modern method.

Be sure when you ear-tag your pigs not to clamp the tag so tight that it will stop the circulation of blood. It is painful, and sometimes the tag will make the ear decay and the tag will drop out and be lost.

GRADE STANDARDS FOR TOMATOES.

The Minister for Agriculture (Hon. W. N. Gillies) has announced that grade standards for tomatoes have been gazetted which provide for three grades—namely, "A," "B," and "C," and applies to the whole of Queensland:—

"A" grade shall consist of sound, clean, well-formed, mature fruit, free from cat-face and other blemish, and not sunburnt.

"B" grade shall consist of sound, clean, mature fruit and contain not more than 25 per cent. of blemished fruit, and not sunburnt.

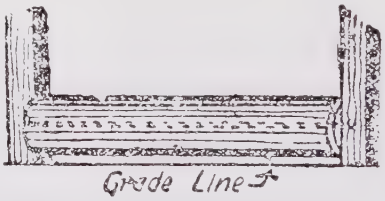
"C" grade shall consist of sound, clean, mature fruit, and contain more than 25 per cent of fruit affected with cat-face or other blemish and not sunburnt.

It has been decided to enforce these standards, and growers are therefore warned that if they persist in sending immature, sunburnt, or blemished fruit that does not comply with the above standards they will be liable to prosecution.

At present some very inferior tomatoes are being placed on our local market, which are palpably immature, and in some cases diseased and badly blemished. Fruit of this nature must not be marketed, and if marketed will be liable to seizure and destruction.

INGENIOUS PIG GATE.

An Iowa (U.S.A.) farmer uses a novel home-made gate on his stock farm, which allows horses and cattle to pass, but which prevents the pigs from leaving the pasture to which it provides entrance. The gateway really is open except for a roller 14 in. in diameter, extending between the two gate posts, and just far enough above the ground so that it will work well. The roller consists of three circular plank wheels, two of which are used at the ends and one in the middle



of the roller. Boards 4 in. wide are nailed outside of these wheels, and an old piece of gas pipe is used as the central axle, holes being bored through each of the wheels for the admission of this pipe. The two ends of the pipe are anchored in the fence posts. Horses and cattle can step over the roller, but when pigs attempt to climb over it spins freely, and throws the pigs back into the paddock.—"Country Gentleman."

PSYCHOLOGY IN DAIRYING.

Dairy cows form very strong habits (points out a writer in the South African Departmental Journal), and if the dairyman makes use of this trait much of the routine work becomes simplified and easier. Regularity in systematic operations is essential. Irregularities worry cows and undoubtedly affect the milk yield—milk production is largely a matter of nervous force. Ordinarily cows are milked twice a day at regular intervals, morning and evening. High-producing cows, however, should be milked more frequently. Whatever the periods, the milking should be done punctually and regularly, quietly and thoroughly, by intelligent, capable, cleanly, and kind milkmen.

If possible, milkmen should always milk the same cows; cows resent strange milkers. It is a good practice, supported by cow psychology, to let the milkman remove her calf and feed her a tempting ration of bran mash—she will adopt him and yield her milk to him willingly and liberally.

Photo. by Sport and General Press Agency, Limited, London.]

PLATE 151.—THE HOME-COMING.

The breeders of the Wessex Saddleback Pig, a breed not yet introduced into Queensland, are keenly interested in the paddock system of feeding. They provide abundant scope and sweet, succulent pasture for their pigs. This is the system being advocated for Queensland, where both climatic conditions and environment favour the open-air system of pig-breeding.

PLATE 152.—THE CHAMPION PEN OF BERKSHIRE BACON PIGS AT THE RECENT GYMPIE SHOW, THE PROPERTY OF MR. S. POWELL, OF WIDGEE. Note the even quality of this group and their all round excellence. The Berkshire is an Ideal Farmers' Pig; useful both as a pure-bred and for crossing with the Tamworth and other breeds for Bacon Production

PLATE 153.—ROYAL AGRICULTURAL SHOW, NEWCASTLE. 24132. TAMWORTH BOAR "KNOWLE BRUCE" (2971). BRED BY HIMSELF.
FIRST AND CHAMPION AND RESERVE CHAMPION.

The Champion Tamworth Boar at the Royal Agricultural Societies Show, held at Newcastle (England) last year.

This Boar, "Knowle Bruce" (2971), was the property of that famous old breeder (recently deceased), Robert Hibbard, of Warwickshire. The boar won First Prize and a Reserve Champion also. Note his great length and the straightness and depth of the body. The Tamworth has been improved very considerably in this regard in recent years.

Our photo. by courtesy of "Sport and General Press Agency, Ltd.," London, Copyright.

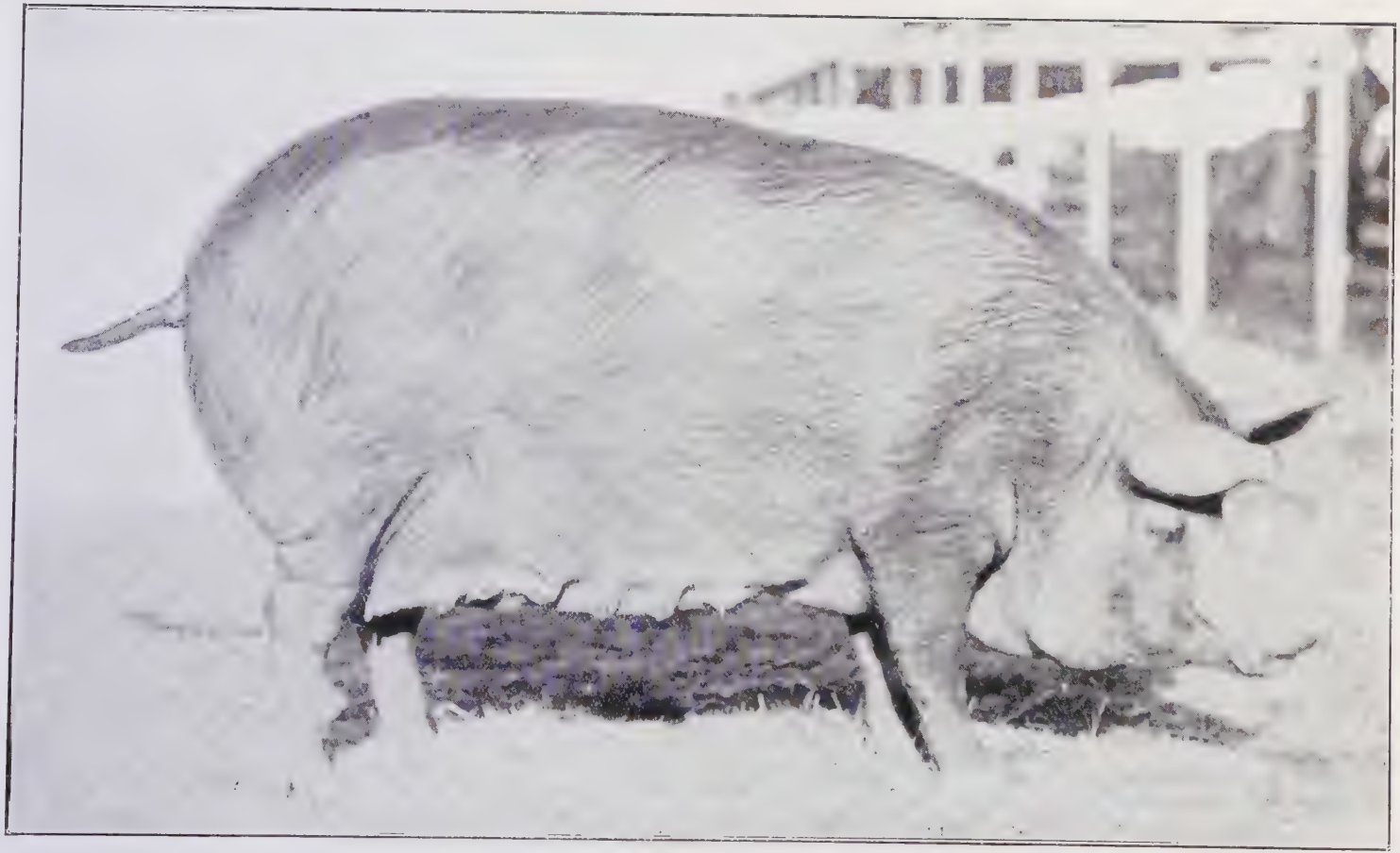


Photo. by Sport and General Press Agency, Limited, London.]

PLATE 154.—A PROMINENT PRIZE WINNING TAMWORTH SOW AT THE ROYAL SHOW, DERBY, ENGLAND, 1924. "KNOWLE FAVOURITE," 2991.
PROPERTY OF THE LATE ROBERT IBBOTSON.
Note the compact deep Carcase and Fine Quality Skin and Hair.

GESTATION CHART FOR PIGS.

Jan.	Date of Farrowing	Feb.	Date of Farrowing	March.	Date of Farrowing	April.	Date of Farrowing	May.	Date of Farrowing	June.	Date of Farrowing	July.	Date of Farrowing	Aug.	Date of Farrowing	Sept.	Date of Farrowing	Oct.	Date of Farrowing	Nov.	Date of Farrowing	Dec.	Date of Farrowing.
1	22 April	1	23 May	1	20 June	1	21 July	1	20 Aug.	1	20 Sept.	1	20 Oct.	1	20 Nov.	1	21 Dec.	1	20 Jan.	1	20 Feb.	1	22 Mar.
2	23 ,,	2	24 ,,	2	21 ,,	2	22 ,,	2	21 ,,	2	21 ,,	2	21 ,,	2	21 ,,	2	22 ,,	2	21 ,,	2	21 ,,	2	23 ,,
3	24 ,,	3	25 ,,	3	22 ,,	3	23 ,,	3	22 ,,	3	22 ,,	3	22 ,,	3	22 ,,	3	23 ,,	3	22 ,,	3	22 ,,	3	24 ,,
4	25 ,,	4	26 ,,	4	23 ,,	4	24 ,,	4	23 ,,	4	23 ,,	4	23 ,,	4	23 ,,	4	24 ,,	4	23 ,,	4	23 ,,	4	25 ,,
5	26 ,,	5	27 ,,	5	24 ,,	5	25 ,,	5	24 ,,	5	24 ,,	5	24 ,,	5	24 ,,	5	25 ,,	5	24 ,,	5	24 ,,	5	26 ,,
6	27 ,,	6	28 ,,	6	25 ,,	6	26 ,,	6	25 ,,	6	25 ,,	6	25 ,,	6	25 ,,	6	26 ,,	6	25 ,,	6	25 ,,	6	27 ,,
7	28 ,,	7	29 ,,	7	26 ,,	7	27 ,,	7	26 ,,	7	26 ,,	7	26 ,,	7	26 ,,	7	27 ,,	7	26 ,,	7	26 ,,	7	28 ,,
8	29 ,,	8	30 ,,	8	27 ,,	8	28 ,,	8	27 ,,	8	27 ,,	8	27 ,,	8	27 ,,	8	28 ,,	8	27 ,,	8	27 ,,	8	29 ,,
9	30 ,,	9	31 ,,	9	28 ,,	9	29 ,,	9	28 ,,	9	28 ,,	9	28 ,,	9	28 ,,	9	29 ,,	9	28 ,,	9	28 ,,	9	30 ,,
10	1 May	10	1 June	10	29 ,,	10	30 ,,	10	29 ,,	10	29 ,,	10	29 ,,	10	29 ,,	10	30 ,,	10	29 ,,	10	1 Mar.	10	31 ,,
11	2 ,,	11	2 ,,	11	30 ,,	11	31 ,,	11	30 ,,	11	30 ,,	11	30 ,,	11	30 ,,	11	31 ,,	11	30 ,,	11	2 ,,	11	1 April
12	3 ,,	12	3 ,,	12	1 July	12	1 Aug.	12	31 ,,	12	1 Oct.	12	31 ,,	12	1 Dec.	12	1 Jan.	12	31 ,,	12	3 ,,	12	2 ,,
13	4 ,,	13	4 ,,	13	2 ,,	13	2 ,,	13	1 Sept.	13	2 ,,	13	1 Nov.	13	2 ,,	13	2 ,,	13	1 Feb.	13	4 ,,	13	3 ,,
14	5 ,,	14	5 ,,	14	3 ,,	14	3 ,,	14	2 ,,	14	3 ,,	14	2 ,,	14	3 ,,	14	3 ,,	14	2 ,,	14	5 ,,	14	4 ,,
15	6 ,,	15	6 ,,	15	4 ,,	15	4 ,,	15	3 ,,	15	4 ,,	15	3 ,,	15	4 ,,	15	4 ,,	15	3 ,,	15	6 ,,	15	5 ,,
16	7 ,,	16	7 ,,	16	5 ,,	16	5 ,,	16	4 ,,	16	5 ,,	16	4 ,,	16	5 ,,	16	5 ,,	16	4 ,,	16	7 ,,	16	6 ,,
17	8 ,,	17	8 ,,	17	6 ,,	17	6 ,,	17	5 ,,	17	6 ,,	17	5 ,,	17	6 ,,	17	6 ,,	17	5 ,,	17	8 ,,	17	7 ,,
18	9 ,,	18	9 ,,	18	7 ,,	18	7 ,,	18	6 ,,	18	7 ,,	18	6 ,,	18	7 ,,	18	7 ,,	18	6 ,,	18	9 ,,	18	8 ,,
19	10 ,,	19	10 ,,	19	8 ,,	19	8 ,,	19	7 ,,	19	8 ,,	19	7 ,,	19	8 ,,	19	8 ,,	19	7 ,,	19	10 ,,	19	9 ,,
20	11 ,,	20	11 ,,	20	9 ,,	20	9 ,,	20	8 ,,	20	9 ,,	20	8 ,,	20	9 ,,	20	9 ,,	20	8 ,,	20	11 ,,	20	10 ,,
21	12 ,,	21	12 ,,	21	10 ,,	21	10 ,,	21	9 ,,	21	10 ,,	21	9 ,,	21	10 ,,	21	10 ,,	21	9 ,,	21	12 ,,	21	11 ,,
22	13 ,,	22	13 ,,	22	11 ,,	22	11 ,,	22	10 ,,	22	11 ,,	22	10 ,,	22	11 ,,	22	11 ,,	22	10 ,,	22	13 ,,	22	12 ,,
23	14 ,,	23	14 ,,	23	12 ,,	23	12 ,,	23	11 ,,	23	12 ,,	23	11 ,,	23	12 ,,	23	12 ,,	23	11 ,,	23	14 ,,	23	13 ,,
24	15 ,,	24	15 ,,	24	13 ,,	24	13 ,,	24	12 ,,	24	13 ,,	24	12 ,,	24	13 ,,	24	13 ,,	24	12 ,,	24	15 ,,	24	14 ,,
25	16 ,,	25	16 ,,	25	14 ,,	25	14 ,,	25	13 ,,	25	14 ,,	25	13 ,,	25	14 ,,	25	14 ,,	25	13 ,,	25	16 ,,	25	15 ,,
26	17 ,,	26	17 ,,	26	15 ,,	26	15 ,,	26	14 ,,	26	15 ,,	26	14 ,,	26	15 ,,	26	15 ,,	26	14 ,,	26	17 ,,	26	16 ,,
27	18 ,,	27	18 ,,	27	16 ,,	27	16 ,,	27	15 ,,	27	16 ,,	27	15 ,,	27	16 ,,	27	16 ,,	27	15 ,,	27	18 ,,	27	17 ,,
28	19 ,,	28	19 ,,	28	17 ,,	28	17 ,,	28	16 ,,	28	17 ,,	28	16 ,,	28	17 ,,	28	17 ,,	28	16 ,,	28	19 ,,	28	18 ,,
29	20 ,,	—	—	29	18 ,,	29	18 ,,	29	17 ,,	29	18 ,,	29	17 ,,	29	18 ,,	29	18 ,,	29	17 ,,	29	20 ,,	29	19 ,,
30	21 ,,	—	—	30	19 ,,	30	19 ,,	30	18 ,,	30	19 ,,	30	18 ,,	30	19 ,,	30	19 ,,	30	18 ,,	30	21 ,,	30	20 ,,
31	22 ,,	—	—	31	20 ,,	—	—	31	19 ,,	—	—	31	19 ,,	31	20 ,,	—	—	31	19 ,,	31	22 ,,	31	21 ,,

NOTE.—Black figures in above table indicate date of service.

This chart presents in an instructive form figures relating to the gestation period of brood sows. For example, a sow mated to the boar on 1st January is due to farrow on 22nd April; a sow mated on 1st July is due on 20th October The chart should be preserved for future reference by breeders of all classes of pigs. The normal period of gestation, *i.e.*, the period from the time of conception to the birth of the young pigs, is 112 days, this period is sometimes remembered as roughly three months three weeks three days, or 16 weeks, With very young sows the period is sometimes of shorter duration, and instances are on record where young sows have farrowed at from 100 to 108 days after becoming pregnant: on the other hand, old sows in abnormal condition have been known to carry their young for more than 140 days.—E. J. SHELTON, H.D.A., Instructor in Pig Raising.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1924.	OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	5 33	5 50	5 3	6·9	4 51	6·32
2	5·32	5·51	5·2	6·10	4·51	6·33
3	5·31	5·51	5·1	6·11	4 50	6·34
4	5·30	5·52	5·0	6·12	4·50	6 35
5	5·29	5·52	5 0	6·13	4·50	6·36
6	5·28	5·53	4·59	6·13	4·50	6·36
7	5·27	5 53	4 59	6·14	4·50	6·37
8	5 25	5·54	4·58	6·14	4·51	6 37
9	5 24	5 54	4 57	6 15	4·51	6 38
10	5·23	5 55	4 57	6·16	4 51	6·39
11	5·22	5·55	4·56	6·17	4 52	6 39
12	5·21	5·56	4·56	6·18	4·52	6 40
13	5·20	5·56	4·55	6·18	4 52	6·40
14	5·19	5·57	4 55	6·19	4·53	6·41
15	5 17	5 58	4 54	6·20	4·53	6·41
16	5·16	5 58	4 54	6·20	4·53	6·42
17	5·15	5·59	4 53	6·21	4·54	6·42
18	5·14	6·0	4·53	6·22	4·54	6·43
19	5·13	6·1	4·52	6 23	4·55	6·43
20	5·12	6·1	4·52	6·24	4·55	6·44
21	5·11	6 2	4·52	6·25	4·56	6 45
22	5·10	6 3	4·52	6 25	4·56	6 45
23	5·9	6·3	4·52	6 25	4 57	6·46
24	5·9	6·4	4 51	6·27	4·57	6·46
25	5 8	6 4	4 51	6·28	4 58	6·47
26	5·7	6 5	4 51	6·28	4·58	6 47
27	5·7	6·5	4·51	6 29	4 59	6 48
28	5·6	6 6	4·51	6 30	5·0	6·48
29	5 6	6 7	4·51	6 31	5 0	6·49
30	5·5	6·7	4·51	6 31	5·1	6·49
31	5·4	6·8	...	...	5·1	6·49

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

6 Oct.	☾	First Quarter	12 30 a.m.
13 „	○	Full Moon	6 21 a.m.
21 „	☽	Last Quarter	8 54 a.m.
28 „	●	New Moon	4 57 p.m.

Perigee, 3rd and 30th October { 3 6 p.m. / 12 12 a.m.

Apogee, 18th October .. .. 6 18 p.m.

On the 10th October, at 8·17 p.m., Uranus will be in conjunction with the moon about three times the moon's diameter below it. This should be observable in binoculars.

On 22nd October, at about 10 p.m., Regulus will be occulted by the moon at Thursday Island, but not at Cooktown or Cairns, where Regulus will appear just above the edge of the moon; further south the distance between Regulus and the moon will appear greater.

On the 26th October, at 1·0 p.m., Mercury will be in superior conjunction with the sun—that is, on the far side of its orbit beyond the sun, where it will be quite invisible. Venus will be a morning star, and Saturn, Jupiter, and Mars will be visible in the evenings during this month.

4 Nov.	☾	First Quarter	8 18 a.m.
11 „	○	Full Moon	10 0 p.m.
20 „	☽	Last Quarter	3 38 a.m.
27 „	●	New Moon	3 15 a.m.

Apogee, 15th November, 11·0 a.m.
Perigee, 27th November, 10·36 p.m.

Venus, still the most brilliant morning star, will be about five degrees west of Spica (the principal star of Vergo) on the 15th; Mars on that date will be apparently amongst the smaller stars of Aquarius, setting about half-past 1 in the morning. Jupiter will be apparently amongst the stars of Scorpio about 15 degrees to the north-east of Antares. Saturn will be visible only in the east, rising about an hour before the sun.

3 Dec.	☾	First Quarter	7 10 p.m.
11 „	○	Full Moon	5 3 p.m.
19 „	☽	Last Quarter	8 11 p.m.
26 „	●	New Moon	1 45 p.m.

Apogee, 12th December, 6·36 p.m.
Perigee, 26th December, 11·12 a.m.

Mercury will be at its greatest elongation east of the sun on the 10th, and will rise and set one hour and twenty-four minutes after the sun on the 15th, apparently amongst the stars of Sagittarius. Venus will still be the brilliant morning star, rising about 2 a.m. on the 15th, apparently among the stars of Libra; Mars, having apparently reached the constellation Pisces, will set soon after midnight on the 15th. Jupiter will not be so well situated for observation, and will be lost in the sun's rays towards the end of the month. Saturn, as a morning star, will rise about half an hour before Venus in the middle of this month.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

HEALTH FROM THE ORCHARD.

All doctors agree that fresh fruit should be eaten every day. There is convincing evidence that the constituents of the body—flesh-forming substances, fats, starches, salts, and water—when supplied in abundance paradoxically will not maintain life and health. There are certain constituents of the plant-world now known as "vitamins," or accessory food factors, that must be added to the diet if health and growth are to be sustained. A deficiency of vitamins, with a lack of balance in the diet, not only retards growth and nutrition, but is responsible for much of the gastro-intestinal ill-health, anæmia, neurasthenia, and lack of general tone prevalent to-day, and makes people more susceptible to infection and less able to fight against disease.

The main sources of one of the most valuable vitamins are fresh fruits, especially oranges and lemons. When infants are artificially fed, it is necessary to give a teaspoonful of orange juice with two teaspoonfuls of water between feeds for a baby one month old, increased to a tablespoonful at three months. Fruit juices, generally speaking, are sources of all the vitamins, and, in particular, that which prevents scurvy. Captain Cook was able to bring the crew of the "Endeavour" fit and well to Sydney because he used plenty of lemon juice, decoctions of malted barley, and other vitamin-containing fresh foods. Scurvy now has no terrors for explorers provided with orange and lemon juice.

Tomatoes are rich in vitamins, and are best eaten raw.

An interesting experiment in the United States showed that a group of undernourished children gained more weight, when given an orange a day, even than that gained by another group on a glass of milk a day.

The important mineral iron is found in strawberries, lemons, oranges, grapes, pineapples, currants, peaches, bananas, apples, apricots, cherries, and above all, in raisins.

Most sun-dried fruits are not only sources of vitamins, but are also rich in the valuable mineral salts. Raisins contain calcium, magnesium, potassium, phosphorus, and iron in such valuable amounts that, according to Mr. Alma Baker: "Every athlete, every mother, every child should cultivate the raisin habit, as it increases the red corpuscles in the blood by its iron content. If girls would make a habit of eating raisins daily they would discard the rouge pot. Twenty raisins a day keep the rouge pot away."

The organic salts in fruit arouse the appetite and aid digestion by increasing the flow of saliva and gastric juices. They render the blood less alkaline and increase the phosphates in the red blood cells.

Fruits containing oxalates, such as tomatoes, gooseberries, and strawberries, are reputed to be beneficial in bronchitis and asthma.

Fruits containing salicylic acid, such as strawberries, raspberries, currants, blackberries, and oranges, are indicated in rheumatism.

Visitors to Trappist monastries, where the food is mainly fruit and vegetables, with milk and cheese, comment on the fine healthy appearance, the fresh complexion, and bright, sparkling eyes of the monks.

The apple, the "king of fruits," contains potash, soda, magnesia and phosphorus, and is an excellent brain and nerve food, with tonic and laxative properties. Professor Pickersgill, of Dunedin, has demonstrated that the acid of the apple is excellent for the teeth and gums. Thus to the old adage, "An apple a day keeps the doctor away," we may add, "An apple a day keeps the dentist at bay."

The banana, the "bread of the tropics," shares with dates, figs, grapes, and nuts high nutritive properties. It possesses when quite ripe 20 per cent. of sugar.

Pears, quinces, plums, damsons, peaches, apricots, cherries, and grapes are rich in starches and salts.

In a "grape cure," several pounds of grapes are eaten daily. Remarkable results are claimed in certain wasting diseases. They contain glucose or grape sugar easily assimilated. Grapes are said to be beneficial in chronic bronchitis, heart disease, and Bright's disease.

Raspberries and strawberries, being highly acid, clear the blood of uric acid, and act as a tonic and stimulant. The strawberry also contains much iron, and is valuable in anæmia. Thus strawberries and cream is both appetising and nutritious.

Pineapple juice has antiseptic properties, and, together with tinned tomatoes, has prevented and cured "Barcoo rot."

Oranges are good in influenza.

Figs contain 60 per cent. of sugar, and are not only very nutritious, but possess laxative properties.

Nuts are a perfect food, with all the important constituents and little waste.

Fruits should be eaten raw on an empty stomach, or combined with nuts. On a diet of fruit and nuts the colouring of the skin improves, the complexion becomes clear, and the eyes bright. The temper improves, as there are no toxins to be eliminated. Garrod recommends oranges, lemons, strawberries, grapes, apples, and pears for gout.

To maintain an optimum of health, particularly in hot weather, people over forty especially are well advised to eat fruit for breakfast, at lunch, and as dessert at dinner, to make sure of getting enough iron, calcium, phosphorus, regulating acids, vitamins, and cellulose. At least one orange, one apple, or some fruit should be eaten by everybody every day.

REGULARITY IN LIVE STOCK FEEDING.

Although food supplied to live stock may be ample in amount, contain the ingredients which the animal requires, and be supplied under wholesome conditions, the best results will not be obtained unless some regularity of feeding is provided for. This applies more particularly to horses, calves, and pigs.

The horse has a digestive system of some peculiarity. His stomach is, for the size of the animal, very small. He has no gall bladder. The first portion of his small intestine describes a curious S-shaped curve, which is very apt to become blocked, and he has a very capacious, large intestine, which varies very markedly in diameter. The horse was evidently intended to be an animal which ate fairly constantly in small quantities, and where he is grazed naturally that is exactly what he does. But under the working conditions of civilisation it becomes necessary for the horse to spend long hours without eating, and to consume comparatively large quantities of food at one time. This, together with other details in horse management (or mismanagement) results in that most serious disease in the horse—colic.

It is very easy to overload a hungry horse's stomach, and the consequent enlargement, leading to pressure on the intestine, is difficult to overcome. It is also very easy when horses are run down by long-continued malnutrition to produce a condition of impaction of the large intestine; a long-continued case of such impaction is not easy to cure. Besides purgatives, the animals require stimulants and judicious feeding. The prevention of colic in the horse may be summed up as follows:—Provide good food in small quantities, as often as possible; feed regularly; allow plenty of water at all times; do not make the food too bulky for a working animal, but provide part of it as grain.

Similar conditions exist in the case of pigs and calves which are fed large quantities of fluid or sloppy food at long intervals. The state of distension shown by some animals fed under such conditions is unnatural, and not conducive to health. Scours, lymphangitis, and gastric and intestinal weakness are the common result.

CENTRAL EXPERIMENTAL PLOT.

The subjoined table of results is supplied by Mr. C. S. Clydesdale, Assistant Instructor in Agriculture, who supervised the carrying out of this year's tests. Soil samples taken on Mr. Turner's farm and analysed by the Agricultural Chemist showed the soil to be of a light grey, sandy nature in good physical condition with a fair quantity of lime present; there was a deficiency in humus and nitrogen, but the soil contained, otherwise, a fair quantity of mineral plant food in available form.

RESULTS OF EXPERIMENTS WITH WHEAT, RYE, OATS, AND BARLEY, CARRIED OUT ON MR. A. J. TURNER'S FARM, UBOBO, SEASON, 1924.

Section.	Fertiliser Used.	Rate Per Acre.	Wheat.		Rye.		Oats.		Barley.	
			Yield from 1/40 Acre Plot.	Yield Rate Per Acre.	Yield from 1/40 Acre Plot.	Yield Rate Per Acre.	Yield from 1/40 Acre Plot.	Yield Rate Per Acre.	Yield from 1/40 Acre Plot.	Yield Rate Per Acre.
		LB.	LB.	T. C. Q. LB.	LB.	T. C. Q. LB.	LB.	T. C. Q. LB.	LB.	T. C. Q. LB.
A.	Unmanured	..	184	3 5 2 24	108	1 18 2 8	167	2 19 2 16	156	2 15 2 24
B.	Basic Super.	224	195	2 9 2 16	116	2 1 1 20	183	3 5 1 12	173	3 1 3 4
C.	Super.	224	203	3 12 2 0	137	2 8 3 20	172	3 1 1 20	165	2 18 3 20
D.	Meatworks	336	276	4 18 2 8	159	2 16 3 4	208	3 14 1 4	184	3 5 2 24
E.	Blood	224	283	5 1 0 8	176	3 2 3 12	226	4 0 2 24	197	3 10 1 12
F.	Basic Super.	224	269	4 16 0 8	143	2 11 0 8	189	3 7 2 0	175	3 2 2 0
	Potash	112								
	Nitrogen (Blood)	112								
G.	Unmanured	..	223	3 19 2 16	128	2 5 2 24	171	3 1 0 8	147	2 12 2 0
H.	Super.	224	246	4 7 2 12	144	2 11 1 20	178	3 3 2 8	149	2 13 0 24
	Potash	112								
	Nitrogen	112								
I.	Basic Super.	112	243	4 6 2 4	142	2 10 3 24	174	3 2 0 16	157	2 16 0 8
	Potash	56								
	Nitrogen (Blood)	56								
J.	Basic super.	224	239	4 5 1 12	123	2 3 3 20	183	3 5 1 2	148	2 12 3 12
	Potash	112								
K.	Basic super.	224	253	4 10 1 12	147	2 12 0 20	169	3 0 1 12	136	2 8 2 8
	Nitrogen (Blood)	112								
L.	Potash	112	238	4 5 0 0	135	2 16 0 8	157	2 16 0 8	141	2 10 2 12
M.	Unmanured	..	217	3 17 2 0	119	3 1 3 4	173	3 1 3 4	132	2 7 0 16

General Notes.

Advantages of Oats.

Oats have certain advantages over barley, which to a lesser degree apply to wheat. These are:—

1. They are less liable to diseases and frosting.
2. They give a heavier crop in most seasons.
3. They have a better feeding value.
4. More fodder is grown after grazing or cutting.

Some complaint has been made of the unpalatable nature of green oats as compared with barley and wheat, and certainly stock prefer oats in the dry state or (except in the case of horses) as silage, but they will take to the feed after a while. Mulga and Sunrise are preferred to Algerian.

A Vigorous Crop.

The chief reason why oats have not been more grown is that they have always given place to wheat, and are seldon grown on fallow. The risk of lodging, given as a reason for not sowing on fallowed land, is in itself an indication of the vigorous nature of the crop and its value for grazing. By judicious choice of varieties, oats can be grown on any farm, and are a cheaper crop to handle than maize. Wheat-growers who are desirous of increasing their sheep-carrying capacity would do well to try oats as a means of tiding themselves over times of shortage and as an aid in lamb-raising.

The importance of early maturity in oats is strongly emphasised. For early lambs one must have early feed, and Algerian oats no longer fill the bill.

The growing of oats on the farm would save the trucking of maize from the coast. If in the shape of straw and grain, there is no danger of the grain sweating if it is put dry into a tank or bin, as is done in parts of Victoria. Our early varieties grow tall enough and the seed is plump enough even in the dry districts.

As competition becomes keener, land values higher and settlement closer, farmers will turn more to oats in connection with stock-raising—primarily for grazing, choosing the most palatable sorts, but also for use in the form of silage, chaff, and grain.

Oats for Fodder.

The value of oats as food for stock is not sufficiently appreciated, says one of the plant breeders of the New South Wales Department of Agriculture. The idea that it is only possible to grow them in districts with a comparatively good rainfall has limited the production, but we now have such early-maturing sorts as Mulga, Sunrise, and Lachlan, which yield a payable crop in any district in which wheat will grow.

For sheep, cattle, and horses the oat is an ideal ration. Sheep men will admit the value of a reserve of fodder for a dry time and the value of a grazing crop for lambing ewes, but it is wise to supplement the natural pasture as a regular thing. Reserves may be kept in the form of hay or, if mice are bad, straw and stripped grain, stored preferably in large corrugated-iron tanks. Such fodder would provide, with pasture, sufficient feed throughout the year, keeping the wool uniform and unbroken in staple, the sheep in good condition, and fattening early lambs. Dairymen usually "bank" on the maize and summer fodders, putting up with a diminution of the milk flow during the late winter and spring months. This gap is filled well by oats, to be cut and fed to the cows—the paddock can be shut up for a second and often a third cut before the maize comes in. For horses many prefer to feed wheaten chaff, but even where oaten hay is not used all farmers appreciate the addition of whole or crushed oats to the ration.

Bailey's Queensland Flora at a Reduced Rate.

With the object of making the "Queensland Flora," by the late F. M. Bailey, available to officers in the Government service who might find it of use to them in their work, such as officers of the Department of Agriculture and Stock, of the Queensland Forest Service, and school teachers, it has been decided to reduce the price to officers to whom the book would be useful in their work from £1 10s. to £1 the set of six volumes and general index. Applications for the work at the reduced rate accompanied by remittance should be made to the Under Secretary, Department of Agriculture and Stock, Brisbane, or direct to the Government Botanist, Botanic Gardens, Brisbane.

Misleading Land Advertisements.

Recently the Minister for Agriculture and Stock (Hon. W. N. Gillies) had occasion to refer to what he described as the ill effects of land speculation generally, and on the banana industry in particular, and said that his attention had been called to what he considered misleading advertisements concerning the profits that could be made out of banana growing in Queensland. He had always argued that land (particularly in a country like Queensland) supplied free of charge by the Almighty for the use of the people should be reasonably priced, and that cheap land and high wages went hand in hand, whereas dear land was always an argument in favour of lower wages and lower returns for the man who worked the land—the farmer. A few years ago, he continued, land speculators on the Tweed River received as high as £130 an acre for unimproved land. Some of this land had been sold thirteen or fourteen years ago for £5 and £6 an acre. A few years later bunchy top broke out, and scores of industrious banana growers were ruined. The banana industry, though profitable in places, was subject to numerous pests and diseases, and there was no reason why fabulous prices should be paid by honest and industrious farmers to increase the profits of speculators and commission agents.

Bacteria in the Bucket.

Interesting determinations of the contamination of milk by unclean milking buckets have been made at Hawkesbury Agricultural College. Pails were scrubbed in cold water, washed in hot soda water, and then divided into two groups. One group was rinsed in hot water (145 to 155 deg. Fahr.), inverted on drying shelves and left for four hours. The other group of pails were steamed for sixty seconds and inverted on the same set of shelves to dry.

The average bacterial content of the two lots of buckets showed that the bacteria added to the milk by utensils can be reduced by more than 90 per cent. if steps be taken to partly sterilise them. The use of steam on the farm is only exceptionally possible at present, but immersion of well-cleansed utensils in vigorously boiling water, in which they are allowed to remain until they have attained its temperature, is very effective, both germicidally and by virtue of subsequent rapid drying. Practicable farm methods of greatly reducing the contamination due to utensils are:—

1. Thorough scrubbing in cold or lukewarm water. Hot water at this stage makes cleaning very difficult.
2. Scrubbing in a hot soda solution.
3. Immersing in actively boiling water for ten or more seconds.
4. Inverting to dry in a sunny, dust-free atmosphere.

Rapid drying is very important, because without moisture bacteria cannot increase their numbers. Immersion in boiling water or steaming means rapid drying, because hot water runs off vessels almost twice as readily as cold, and the heated metal rapidly evaporates the water film. Most utensils sold by reputable suppliers are now made free from corners and crevices difficult to clean and forming infective foci. Battered or rusty utensils are a constant source of milk infection, because they are impossible to clean. A piece of such a can under the microscope has a surface consisting of ridges and valleys, craters and peaks, and in the recesses microbes and milk are safe from brush, and well guarded against heat.

Where whey is conveyed in the milk cans, particular care should be taken with their cleaning. Such cans are apt to be greasy, are certainly heavily infected with bacteria, and, if not thoroughly cleaned and scalded, will heavily contaminate the milk. Whenever there is doubt of a can having been properly attended to, it should be well scalded and cooled before milk is placed in it.

A Northern Sanctuary.

The reserve for recreation, camping, and water at the Johnstone River Falls, Malanda, has been declared a sanctuary in which it is unlawful for any person to take or kill any animal or bird, in accordance with "*The Animals and Birds Act of* 1921."

The Press and Farmers' Organisation.

In the course of a recent reference to Agricultural Council matters, the Minister (Hon. W. N. Gillies) expressed the opinion that much of the criticism in the country was due to the fact that sufficient publicity was not given to the council meetings. He had expressed the view recently that the council would have been well advised to have admitted the Press to its meetings. The Brisbane Press generally had been sympathetic towards the new scheme of organising farmers, and if the discussions at the council meetings were published in the daily newspapers he thought the effect would be all in favour of the council.

Ratoon Cotton Advance.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) has announced that, until the 31st July, 1925, an advance of 3d. per lb. will be paid to growers for ratoon seed cotton of good quality, clean and free from disease, delivered at a ginnery. This advance will be subject to a reduction in the case of ratoon cotton delivered at a factory not complying with the conditions for the advance of 3d. per lb. If, after the payment of all expenses for ginning and marketing, there is any surplus arising out of the sale of the ratoon cotton lint over and above the original 3d. per lb., the surplus will be distributed among the ratoon cotton growers.

Banana Grade Standards.

In lieu of the former grade standards for Cavendish Bananas—"Choice," "Firsts," and "Seconds"—the following standards have now been approved:—

"Special" shall mean sound fruit, free from blemish and properly packed, having a minimum length of eight inches and a minimum circumference of five inches.

"Choice" shall mean sound fruit, properly packed, having a length of less than eight but not less than seven inches and a minimum circumference of four inches.

"Standard" shall mean sound fruit, properly packed, having a length of less than seven but not less than five and one half inches and a minimum circumference of four inches.

Distributing the Risk—Diversified Farming.

Farm cost figures gathered from North Dakota farms for the past five years (says a North Dakota Agricultural College circular) seem to indicate beyond any doubt that a well-balanced system of agriculture pays best in the long run. The one-crop farmer may possibly make a big stake one year, and even for several years, but he is bound to fall when hard times strike him.

Farming at best is pretty much of a gamble, and one-crop farming is the most extreme type of gambling that a farmer can indulge in. Making good as a farmer is a job of a lifetime, and it is the average net income over a period of fifteen to twenty years which determines a man's success or failure. For this reason it seems desirable to eliminate as much of the risk as possible. The farm having several sources of income is not entirely dependent upon any one of these, and a total failure on a farm of this kind is practically impossible. Livestock products bring an income every month which can be used to pay grocery bills and other current expenses. The farmer who raises a large percentage of his own food has always got something to live on, even if times be rather hard.

It seems, therefore, that the system of farming which pays the best, and the system which insures the greatest degree of safety, is a well-balanced system providing for a definite rotation of crops, and providing, also, for the raising of live stock. Farm cost figures seem to indicate that the diversified farmer with considerable investment in live stock is usually the farmer who weathers hard times best in any community. The one-crop farmer or the man who depends almost entirely upon crops to the exclusion of live stock is generally the man who goes bankrupt first of all when hard times hit the community.

Fruit Fly Lure.

The Minister for Agriculture (Hon. W. N. Gillies) stated recently that, following on the interest taken by the Department of Agriculture in the Harvey Fruit Fly Lure, which commenced with the supervision of a number of experiments as to its efficacy, an agreement has now been entered into and arrangements made with Mr. Harvey, the result of which growers will be enabled to secure supplies of a standardised lure at a cost very much lower than would have been the case had the sale of the lure been continued by Mr. Harvey on ordinary business lines. Briefly, the agreement is to the effect that Mr. Harvey will manufacture and supply enough lure at all times to satisfy the demands of the growers at a standardised strength, so that when one part of the lure is mixed with 10 parts of water the lure will be in a useable form. The price of the lure is 10s. per gallon, plus packing costs. In the event of an improved lure being substituted any increase in the cost of manufacture of the specific will be met by an increase in the price of the lure. To enable this to be done the Government has given material assistance financially to Mr. Harvey. This agreement being completed, arrangements are now being made whereby growers will be able to secure, at the price indicated, supplies of the lure of a standard quality with as little delay as possible.

Slaughtering Act Regulations.

The Regulations under the Slaughtering Act have been revised, some being completely altered, while others are as formerly, with possibly a few minor alterations to conform with present-day needs. The main alterations are as follow:—

1. Fees for inspection (Regulation 37).—These have been increased to compare with the Southern States and the Commonwealth and in accordance with existing values, the alterations being:—

	Present Fees. Each.	New Regulations. Each.
Cattle	3d.	6d.
Sheep and Goats	½d.	1d.
Calves	¼d.	3d.
Swine for pork	3d.	3d.
Swine for curing	1d.	3d.

2. Regulation 5.—A slaughtering license is increased from £1 to £2 each year, and the transfer fees from 2s. 6d. to 5s. This regulation also provides that no extra fee shall be required for a provisional license, but if the licensing authority finds that the alterations necessary before the issue of the license have not been executed, the provisional fee shall be forfeited.

3. Regulation 1.—The age for a holder of a slaughtering license must not be less than twenty-one years, and the term "owner" covers all degrees of partnership. Trouble has before been experienced in deciding the ownership.

4. Regulation 6 provides that a license to be issued shall date from the application instead of, as formerly, from the date of actual issue.

5. Regulation 7 (*c*).—A new provision giving power to the court to refuse an application to anyone who, within the previous three years, has been convicted of cattle stealing or of offences under the Diseases in Stock Acts or the Brands Acts.

6. Regulation 11 requires the clerk of petty sessions to keep a register of licenses issued which the public can examine at any time on payment of a fee of 2s.

7. Regulation 12 increases the time wherein an aggrieved person may present his grievances from seven days to fourteen days.

8. Regulation 17 prohibits the slaughter of any cow for human consumption within fourteen days of parturition.

9. Regulation 26 requires that the disposal of blood shall take place at least 80 yards from the slaughter-house and be buried 18 inches deep.

10. Regulation 30 requires privies and urinals to be 80 yards from the buildings.

11. Regulation 33.—Pig stys must be roofed and drained; swine to be fed on concreted floor, and must not be fed on the flesh of any animal other than an animal that has been slaughtered.

12. Regulation 69.—The boiling pots and vats shall be 80 yards from the slaughtering place.

Levy on Stanthorpe Fruit and Vegetable Growers.

A Regulation has been issued under the Primary Producers' Organisation Acts providing that the levy that is being made on fruit and vegetable growers in the Stanthorpe district, may be collected by the Railway Department at the recipient's end of the journey and not at the sender's end.

Pig Raising—Instructor's Itinerary.

Following is Mr. Shelton's itinerary for the remainder of the month:—

Monday	Dec.	15—Attend at pig trucking at Wooroolin during morning. Address farmers and give lantern lecture, Murgon 8 p.m.
Tuesday	„	16—Attend at pig trucking at Mondure in the morning. Address farmers and give lantern lecture at Boonara at 8 p.m.
Wednesday	„	17—Visit farms in Wondai district and give lantern lecture, Wondai 8 p.m.
Thursday	„	18—Return to Brisbane.
Friday	„	19—Attend official laying of Foundation Stone of new Curing Rooms at Queensland Co-operative Bacon Factory, Murarrie.
Saturday	„	20—Head Office.

Note.—Visits will be paid to State Schools where possible and addresses given to the school children, who, with their parents, are welcome to attend all lectures. Unless otherwise arranged locally by L.P.A.'s, the lantern lectures will be given in the State Schools at each centre visited.

The Cultivation of Beet.

Beetroot is a favourite summer vegetable. It can be grown almost anywhere and on practically all soils, but those of a heavy, clayey nature are the least suitable, and good crops of best quality cannot be expected under those conditions.

Beet has a taproot, and requires deep working of the soil. Very rich soils are not altogether suitable, as with this crop extra large roots are not popular. For the same reason it is well not to overplant too early in the spring, as, if not quickly used, the roots become too large before the season is over. Smaller successive sowings will be found to answer requirements much better. The seed can be planted throughout the year, except during the cold, wet, winter months. For good quality, the crops should be quickly grown, as otherwise they become somewhat tough, woody, and coarse flavoured.

The position should be a sunny one, and, for household plots, rows 12 inches apart are sufficient. For commercial culture the rows should be spaced not less than 15 inches apart, and even up to 30 inches. The seed as purchased is fairly large and has a corky appearance; this is really the seed fruit, which contains several seeds. The germination is sometimes disappointing, but this is mostly due to faulty sowing. Should the surface soil be dry and light in texture, the seed must be planted deep in order to reach the moisture, but if damp, a depth of about 1 inch is sufficient.

To get the moisture through the corky covering of the seed is always very difficult, and to overcome this it is usual to soak the seed overnight previous to planting. Where possible the seed should be spaced about 1 inch apart in the drills and thinned to at least 4 or 6 inches apart, according to the variety. When young, the plants can be transplanted if carefully handled so as not to interfere with the roots, but this course is only recommended where there are wide spaces in the rows as the result of faulty germination; the plants from the thicker portions of the field may then be utilised for this purpose. The crop needs little attention other than cultivation to keep down weeds and a sufficient supply of moisture. The roots can be used for household purposes as soon as they are large enough, but they should not be forwarded to market until more fully developed. In marketing, neither roots nor tops should be trimmed.

Great care must be exercised in harvesting, as bruising or breaking of the taproot is a serious drawback, causing bleeding to take place in cooking, which leaves the vegetable very pale in colour. The beet is rich in sugar, and, if allowed to bleed, a large quantity of this constituent is also lost. In cooking, if the utensil is large enough, it is always advisable to allow the tops to remain, but if the vessel will not permit of this, screwing off the tops is preferable to cutting them.

The long varieties are not favoured by housewives on account of the difficulty of accommodating them in ordinary pots; for this reason the turnip-rooted sorts are more popular. Varieties recommended are Eclipse, Egyptian, Crimson Globe, and Electric.

Central Cane Prices Board.

The Central Sugar Cane Prices Board has been constituted to consist of the following members, as from the 13th November, 1924:—

His Honour Mr. Justice O'Sullivan—Chairman;
Thos. A. Powell—Canogrowers' Representative;
Bernard R. Riley—Millowners' Representative;
J. McC. MacGibbon—Qualified Sugar Chemist; and
A. R. Henry—Person experienced in accountancy and audit.

Butter Board.

Notice of intention to declare that butter produced at factories in Queensland shall, for a period of three years as from the 22nd November, 1924, be a commodity under and for the purposes of the Primary Products Pools Acts, has been issued. If cream suppliers and butter factories are in favour, a Board will be constituted to consist of five representatives of growers and one to represent the Council of Agriculture. Representatives of growers will be elected by butter companies, and if a company has more than one factory, it will be entitled to a vote for each factory. The companies operating in the State are divided among five different divisions, and each division shall elect one representative. The Board, if constituted, will be empowered to make levies on companies when necessary to meet payment of allowances and expenses to members of the Board as the Minister for Agriculture may think fit. No company shall deliver butter to the Board before the date to be published by the Minister in the "Government Gazette." Until such date, on Saturday in each week, every company shall deliver to the Board, in respect of each of its factories, a return showing the quantity of butter manufactured during the past preceding seven days, and the names and addresses of the persons to whom such butter was delivered or consigned. Agents for the sale of butter will furnish similar returns. The Board will also be empowered to make monetary arrangements necessary to effect equalisation of returns to companies. The Minister may appoint any person or persons to inspect and take copies of books, papers, vouchers, &c., of any company or agent, for the purpose of ascertaining or verifying any particulars mentioned in returns of companies. Persons eligible to vote on any referendum or election in connection with the said Board shall be representatives of companies manufacturing butter in the State of Queensland.

Grain Board.

Notice of intention to declare that maize produced from seed sown after the 1st July, 1923, in any part of Queensland, other than the Petty Sessions Districts of Atherton, Herberton, and Chillagoe, shall, for a period of three years from the 22nd November, 1924, be a commodity under and for the purposes of the Primary Products Pools Acts, has been issued. If 75 per cent. of maize growers are in favour of the constitution of the Board, the Board to deal with the crop will be constituted, and will consist of seven elected representatives of the growers, and one person to represent the Council of Agriculture. The growers' representatives will be elected as follows:—

District No. 1 (comprising Pastoral District of Moreton)—Two representatives.

District No. 2 (comprising Pastiral Districts of Darling Downs and Maranoa)—Three representatives.

District No. 3 (comprising whole of Queensland with exception of Districts 1 and 2, and the Petty Sessions Districts of Atherton, Herberton, and Chillagoe)—Two representatives.

The members of the Board, when elected, will hold office for twelve months as from the date of appointment. Persons eligible to vote on any referendum or election before the 30th June, 1925, shall be persons who have, at any time subsequent to the 1st July, 1923, grown for sale maize in any part of Queensland other than the Petty Sessions Districts of Atherton, Herberton, and Chillagoe, and persons eligible to vote at any subsequent referendum or election shall be persons who, at any time during the twelve months preceding such election or referendum, grow for sale maize in any part of Queensland excepting the abovenamed Petty Sessions Districts.

In addition to the usual powers of the Board provided by the Primary Products Pools Acts, the Board may encourage, provide, or assist in providing grain sheds, or engage in other activities as may be approved by the Governor in Council, on the recommendation of the Council of Agriculture.

During a period to be published later, the Board will control the marketing of all maize, marketing including everything involved in the transmission of maize from the producer to the consumer. After such period, the marketing shall be carried on only under the authority of the Board.

A further clause provides that control similar to that described may, from time to time, be extended to oats, barley, rye, canary seed, wheat, and other grain grown within Queensland, provided the provisions of the Primary Products Pools Acts are duly observed.

In order to ensure their names being on the roll of persons enligible to vote in connection with the Board, all persons who grew maize from seed sown after the 1st July, 1923, are invited to send their names at once to the Under Secretary, Department of Agriculture and Stock, Brisbane.

State Wheat Board Election.

The result of the election of a member to represent No. 4 District (old Cunningham electorate) on the State Wheat Board was as follows:—

Thomas Muir (Allora)	323 votes
Richard Roche (Emu Vale)	165 „

As this was the only election necessary for the Wheat Board this year, the following have now been appointed members of the Board, to hold office for one year from the 2nd December, 1924:—

Mark Harrison (Chairman), Robert Swan, A. J. Harvey, B. C. C. Kirkegaard, Thos. Muir, and J. T. Chamberlain.

Canary Seed Board.

Notice of the intention of the Governor to create a Canary Seed Board has been issued. This Board will control canary seed harvested within Queensland during the season 1924-1925—viz., 1st March, 1924, to the 28th February, 1925. If constituted, the Board will consist of three members, one to represent the Council of Agriculture and two to be elected by growers. Nominations will be received by the Under Secretary, Department of Agriculture and Stock, not later than the 8th December, 1924. Such nominations must be signed by at least ten growers of canary seed—*i.e.*, persons who have grown canary seed for the 1924-25 season as defined above. Any petition for a poll to decide whether the Canary Seed Board shall be formed, must be signed by at least fifty growers as above, and must reach the Minister for Agriculture before the 15th December, 1924. In order to insure their names being on the roll of persons eligible to vote, growers of canary seed are invited to send their names at once to the Under Secretary, Department of Agriculture and Stock.

Destruction of Cotton Plants (Black).

Following on the proclamation recently issued declaring the 22nd November to be the day on or before which all cotton plants must be either destroyed or cut down, the 13th December has now been proclaimed as the date on or before which all such cotton prunings, &c., shall be destroyed by fire.

Inspection of Maize for Export.

The Secretary for Agriculture and Stock (Hon. W. N. Gillies) referred recently to a Press paragraph on the subject of the alleged severity of the inspection of the maize submitted for export overseas. Mr. Gillies pointed out that, in the first place, although this inspection is carried out by departmental officers, they are really acting for the Commonwealth Government under the Commerce Act. By an arrangement between the State and Federal Governments various officers of the Queensland Department of Agriculture and Stock have also been appointed Federal officers for the purposes of the Commerce Act. With regard to the maize exportations, Mr. Gillies stated that over half a million bags had already been exported from Brisbane overseas since the beginning of September in this year, and the quality of the maize coming forward had been quite up to the standard required by the Commerce Act, so much so that the rejections have only amounted to a few hundred bags out of the five hundred thousand bags.

The inspection is conducted at the wharves and the examining officers do everything in their power to assist in the exportation, in so far that they are prepared to sample every individual bag in the event of some inferior bags being found on a particular lorry. The result is that because one bad bag may be discovered on a lorry it does not necessarily follow that all the bags on that lorry are condemned. The special complaint mentioned in the Press recently may have originated from the case of a firm that submitted several lorry loads of Burnett maize at a wharf. At the commencement of the examination some inferior bags were discovered and the inspectors offered to test every bag in the consignment in order that good bags might not be rejected equally with bad ones. The merchant, however, in this case did not avail himself of the consideration

offered him, but had the lorries in dispute returned to his produce sheds. He intends regrading the whole of the maize and submitting again for export. The inspectors feel confident that the bulk of it will pass.

The Minister said that while his Department desired to assist in every possible way in the export of surplus maize, it had to be remembered that this was the first year that maize was exported from Queensland in any appreciable quantity, and that it was therefore highly important that the good name of our grain should not be injured by allowing bad samples to be exported. He wished to make it quite clear that the statement, which had evidently been circulated with an object, that the Council of Agriculture was responsible for rejecting maize for export, was absolutely untrue. He also drew attention to a paragraph that appeared in the last issue of "The Farmers' Gazette" in which it was stated that Messrs. Denham Bros. were of opinion that the Department had acted with great discretion, and that its inspectors had deserved every credit for the able manner in which they had carried out their duties in the matter of maize inspection.

Staff Changes and Appointments.

Constable R. Wilson, of Yungaburra, has been appointed an Inspector of slaughter-houses.

Mr. P. Rumball, Poultry Instructor, and all Inspectors of Stock, have been appointed Inspectors of Poultry, as from the 22nd November, 1924.

Successful examinees listed as follows, have been appointed Inspectors under and for the purposes of the Dairy Produce Act:—M. D. O'Donnell, Rosewood; P. A. Kelly, Newtown, Toowoomba; Daniel Culhane, Cambooya; and G. F. E. Clarke, Wyreema.

Constable J. H. Johansen, of Kurilda, has been appointed an Inspector of Slaughter-houses.

Messrs. L. W. Ball and S. T. J. Clarke, Field Assistants to the Department of Agriculture and Stock, have been appointed Managers of the Cotton Experimental Farms at Melton and Monal Creek, respectively.

Mr. N. E. Goodchild, Senior Field Assistant to the Cotton Section of the Department of Agriculture, has been appointed an Inspector under and for the purposes of the Cotton Industry Acts.

Constables A. McCreath and A. B. Clarke, of Stonehenge and Rosewood, respectively, and Mr. Thos. Crawford, of Brisbane, have been appointed Inspectors of Slaughter-houses.

Messrs. Jas. Munro, D. H. Stewart, T. E. Smith, and T. W. Smith, of Stanthorpe, have been appointed Inspectors under and for the purposes of the Diseases in Plants Acts.

The resignation of Mr. C. Storey, as Chairman of the Cattle Creek, Farleigh, Marian, North Eton, Palms, Plane Creek, Pleystowe, and Racecourse Local Sugar Cane Prices Boards, has been accepted, and Mr. F. J. Cherry, Police Magistrate, appointed in his place.

At a recent Executive Council meeting the following appointments to the Department of Agriculture and Stock, with consequential staff adjustments, were approved:—

Mr. E. Graham was appointed Under Secretary, Mr. R. Wilson, Assistant Under Secretary, and Mr. R. P. M. Short, Senior Clerk to the Department. Following on these appointments the existing positions held by Messrs. Graham, Wilson, and Short, namely, Director of Dairying and Cold Storage, Chief Clerk, and Senior Clerk to the Stock Branch, respectively, have been abolished.

Messrs. R. C. Lake and F. J. Webster have been appointed Government Representatives on the Dingo Boards for the Dingo Districts of Gregory and Burke respectively.

Mr. H. Vinnicombe, of Manly, has been appointed an Honorary Inspector under the Diseases in Plants Acts.

Mr. J. P. G. Toft, of the Lands Office, Bundaberg, has been seconded for duty to the Agricultural Bank and appointed Acting Inspector for three months from the 27th December.

Constable G. Beale, of Roma, has been appointed an Acting Inspector of Stock.

Queensland's First Big Export of Maize.

Practically this is the first year in which Queensland has been in a position to be able to test the world's markets with supplies of maize, and the crop immediately following on the big drought has been such that there was no alternative but to send substantial shipments overseas. So far as concerns the present season, this effort is now practically at an end, and we have obtained from Denhams Limited some particulars of what has been done. Up to the present this firm has shipped about 100,000 bags, and other merchants in the State have together made shipments amounting to possibly 300,000 bags—say 400,000 bags in all, or 30,000 tons; and it should be said that many of the merchants have taken big risks in consigning this maize to London. (Up to the first week in December 496,523 bags had been shipped for export at Brisbane—Ed. "Q. A. J.") The first lot was sent over by Denhams Limited in April last by the steamer Waimatti. This, unfortunately, became affected slightly with weevil on the voyage and as a consequence it involved a loss of nearly £3 per ton. However, it was not a large parcel, and its main purpose was to afford information as to the bags that should be used. Those employed in the initial shipment proved satisfactory to buyers, and this shipment has become the pioneer of a very considerable trade.

We are informed that the whole of the maize that has been shipped was purchased in the country districts where grown, and at prices which have left an exceedingly small margin for the shippers.

It is obvious that if trade along these lines is to be continued and developed, all concerned must do their part, and it is gratifying to know that, on the whole, there has been but little cause for complaint against those engaged either in the production or transport of the commodity. Unfortunately, there has been here and there a farmer who ventured to send stuff which he ought to have known would not pass inspection, thus making both buyer and shipper suspicious, and causing much anxiety to those responsible for the soundness of the consignment.

In our opinion, said Mr. Brett, manager for Denhams, the Department of Agriculture has acted with great discretion, and its inspectors deserve every credit for the able manner in which they have carried out their duties. It has not been their fault if any maize was shipped that ought to have been kept back. "We have had maize rejected," said our informant, "but simply because a few bags had been put into a given truck, on the chance of getting it through, and this has had the effect of condemning the whole truck of grain." Other merchants, it was explained, had been placed from time to time in a similar position. It will have to be recognised by growers that it is of no use trying to palm off any maize that is soft, or with a touch of mould, or a sourish smell. In fact, it must be dry, clean, sound grain in order to pass the inspection.

Another point to which Mr. Brett referred was the great assistance afforded by the Railway Department in forwarding the maize from country stations to the ship's side. It was well known that there was at the present season a great demand for trucks for sugar, wool, and other commodities, and in addition came this big demand for transport of maize. We have been in the habit of talking in truckloads, and 1,000 bags has been regarded as a big order; but right in the midst of the busy season for sugar and the export trade in that commodity, together with the regular wool sales, came the demand for conveyance of thousands of tons of maize. As far as was known, said our informant, in no single instance had a boat been missed with shipments of maize booked for it. Indeed there had been times when it would have been quite acceptable had trucks of maize been held up for a few days, as it was coming to hand more rapidly than it could well be disposed of.

The shipping agents also had done all that was possible for them to do; but of course it had to be remembered that Brisbane is not as yet equipped for the handling of large quantities of grain. This trade is quite a new departure, and taking everything into consideration, it would seem that farmer, merchant, shipping agents, the Railway Department, and the inspectors should be congratulated on the results attained.

It is pointed out that the future shipping of maize, so far as concerns the disposal of this year's surplus, depends entirely on the activity or otherwise of the weevil. It is thought that the Downs maize will be quite safe for shipment about February. But the new maize will probably weevil quite quickly on account of the character of the present dropping season, the moisture in the grain and in the atmosphere being favourable to the development of the insect. Unfortunately, Brisbane is not as yet equipped with proper grain drying apparatus. What is needed is the erection of a huge kiln at the water front, so that maize on arrival from the country could be effectively dried. If this were done there is little question that ship owners would fit up their vessels for the carrying of grain in bulk, thus doing away with the expense of providing bags, which in itself is a very heavy tax on the industry.—"Farmers' Gazette," 25th November, 1924.

Answers to Correspondents.

Carob Bean.

"DRUMTOCKTY (Gympie)—

Individual Carob-bean trees bear either male or female flowers respectively. As you appear to have only one tree it is unlikely this will bear pods or seed. It takes about seven years for a Carob-bean tree to bear pods—*i.e.*, when conditions are favourable for their production.

Pumpkin Storage—Eradication of Mosquitoes.

W. W. (Cootharaba)—The Director of Agriculture (Mr. H. C. Quodling) advises:—

(1) In storing pumpkins care should be taken to see that the stalk is cut and not twisted off as is usually done in the field.

In the case of the stalk being broken away from the pumpkins premature decay sets in, and the fruit is unsuited for storage purposes. Similarly, pumpkins should be carefully handled in order to avoid bruising. Store on a thick bedding of dry grass or straw away from all dampness. Prevent pumpkins from touching one another by wisps of straw placed between the pumpkins.

Do not, under any circumstances, store more than two layers deep, unless the pumpkins are particularly undersized. The variety known as Ironbark is the best for storage purposes, and will keep under these conditions for several months.

(2) Use kerosene for eradicating mosquito larvæ. No harm will be done to the water, provided that an excess quantity is not used. In a 1,000-gallon tank two egg-cupfuls will be found to be sufficient.

It is, however, suggested that a better method would be the removal of the cause by screening all inlets and outlets of the tank with fine copper wire gauze.

Pig Feeding.

One of our Northern correspondents recently sent in the following inquiry:—

"Would you be good enough to let me know the proper amount of food to feed pigs to get them ready for baconers in two months' time? I have got four pens of store pigs, with four pigs in each pen—that is, sixteen pigs in all; the weight of these pigs would go roughly 60 lb. each live weight.

"What would be a good ration of feed to give the sixteen pigs per day? I have got the following feed:—Forty gallons of separated milk per day, molasses, pollard, cracked maize, Meggitt's linseed meal and cocoanut oil cake. The pigs are in a fair condition now. What quantity of each of the abovenamed would you advise me to give them per day, as I want them in prime condition in about two months' time. Is it necessary to scald the meals, or will they do mixed with the milk the way they are?"

The Instructor in Pig Raising, Mr. Shelton, advises:—

Provided you have a liberal supply of skim milk and some cereal concentrate like pollard or crushed maize (maize meal) there should be little need to use linseed meal, cocoanut oil cake, or molasses, for a liberal supply of green food (flesh formers) in addition to the milk and maize should make up a sufficient supply of protein in the ration.

For my own use I would prefer to cook the maize meal or soak it in hot water, and when it had made up into a porridge, add skim milk to make it the consistency of cream, and feed same in that way, giving the pigs a liberal supply of skim milk as well (after this food had been consumed). Pollard is a much more satisfactory food for very young pigs, and its addition to skim milk in the proportion of 3 to 4 lb. to the gallon of skim milk is advised. To this ration for pigs from three to four months old, you might add 10 per cent. of linseed oil meal, and whilst doing this it would be very interesting to try one pen with cocoanut oil cake as well. Both these meals should be soaked in scalding water overnight, and the correct proportions added to the feed next morning. After adding the hot water to soak the meal cover the container with a heavy cornsack or two, and the result will be better.

We do not favour the use of molasses in good seasons when there is an abundance of green food, for it is expensive and is unnecessary. It certainly is a very useful addition to the ration in periods of short supply of green foods. In regard to quantity to be given of this mixed ration to your fattening pigs, the best advice is to give the pigs just as much as they will clean up at each meal and feed them twice daily. If the weather is cool an extra feed will hurry them on, but do not overfeed in hot weather, or you will have some losses. Allow the pigs liberal exercise in a roomy pasture in preference to shutting them up in a small sty. Fattening pigs will not over-exercise themselves if they have plenty of food, and the grass, &c., will be an advantage in so far as flesh forming goes, and the factories all want fleshy pigs in preference to very fat "blubbers of lard." The pig that gets all concentrated food and no exercise or flesh-forming foods, is an unprofitable sort. Meat meal used in less than 10 per cent. lots is useful, but if there is plenty of green food you do not require much meat meal. You will note also, that on a falling market, you should aim at keeping the cost of the ration down as low as possible, hence the less linseed or cocoanut oil meal used the better. Home-grown green foods are far to be preferred to high-priced concentrates.

Bacon Factories.

An inquirer has asked for information affecting the development of the pig industry in one of the Western mixed farming and wheat growing areas. Our correspondent stated, *inter alia*:—

There appears to be an increased interest taken in the production of pigs in this district, and to a few of the farmers most interested the future looks fairly bright, but we are so far from a co-operative bacon factory that we think we could do better with a small co-operative bacon factory of our own. The number of pigs sent away from our district last year was more than 1,600, and we think it quite safe in estimating that this year we will market more than 2,000 bacon pigs.

I should be pleased if you could let me know the approximate cost of a small factory complete, capable of treating up to 200 pigs per calendar month; also the gross average profit per pig to 100 lb. weight; also the number of hands required to handle, say, 100 pigs monthly turning them into bacon and smallgoods. I consider the gross profit per pig should be 20s. per 100 lb., which, with twenty-five pigs per week for a start would provide for a working manager to cure bacon and manufacture small goods at, say, £6 per week, two youths as assistants at, say, £4 per week each, which would leave £11 per week for miscellaneous expenses. This to my mind seems a reasonable estimate. A bonus of, say, 2½ per cent. on net annual profit could be paid to manager as an impetus to him to do his best. I simply mention this to give you an idea of our way of looking at this proposition. However, we are imbued with only one idea, and that is to do something to improve our position in life and the prospects of our children who are to follow on. To me it seems that the Western markets should consume all the output from this factory, and we should get all the pigs available in the district over which we would work, and the bacon and smallgoods business within that area should be ours under ordinary conditions, as the retailers could secure fresh supplies more quickly and also save considerably by way of railway freights, also, the producers would save freight on their pigs of, perhaps, 2s. per head. Our idea then is to start with a very small factory, and of course increase its size and capacity as business warrants. My idea is that smallgoods like pork sausages, &c., should be the speciality, and with trains regularly running in all directions through our district we could deliver the goods quickly and regularly in the freshest condition.

We have an idea of running the bacon factory in conjunction with the butter factory which is on co-operative lines. The butter-milk from this factory could be utilised by the bacon factory to fatten store pigs so as to provide themselves with a few fats to fall back on at times when perhaps the supply from the farmers would be low for a week or two, as is only to be expected from time to time.

The answer supplied to our correspondent it will be noted is one of strict caution, for small bacon factories have not been a success (except in exceptional circumstances) in any part of Australia. To sum up the position, it is all a matter of capital. In the words of the manager of one of our largest bacon factories: given sufficient capital to finance the erection of the factory, to pay for the pigs received without

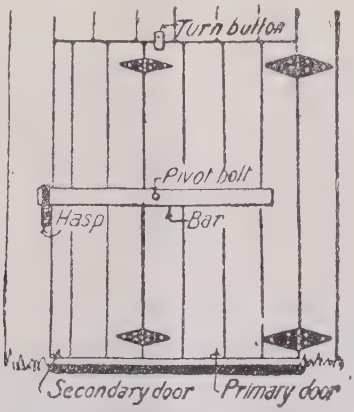
having to keep suppliers waiting until the pigs have been killed and are in process of curing or have been sold, and to provide a sinking fund for lean years and for extension of operations as required; and above all, and this is in reality the crux of the whole question, given the loyal co-operation through good days and bad of the whole of the suppliers and of their earnest endeavours to breed sufficient pigs continuously to keep the factory fully occupied, and to assist at least in consuming and in finding further markets for its products; well, given all these favourable conditions the case bears a different complexion, but can these conditions be guaranteed? Following is the gist of the answer supplied by the Instructor in Pig Raising, Mr. E. J. Shelton:—

It would be better to discuss this matter with the inquirer personally in preference to writing a long letter on the subject. Small bacon factories do not appear to have been a success in any part of Australia. This is largely because the competition is so keen that, unless sufficient capital is available to warrant starting in a fairly large way, the companies at present in operation are able to pay higher prices than the small factory for the first few months, and it would be during this period that the fate of the small concern would be determined. Quite recently on the Atherton Tableland the same question cropped up, and after the directors of the factory there finally decided to instal a comparatively small plant, and after the official opening had actually taken place, they realised that they were up against a very hard proposition, but owing to the operation of the Pig Pool they have been able to control supplies, and this has enabled them already to consider increasing the capacity of their factory to bring it more into line with the other factories operating in the State.

One would rather be inclined to suggest that every other means be exhausted before finally considering the erection of the factory, and to this end getting in touch with the various bacon factories operating in the State at present is suggested with the object of ascertaining if there is any other way of overcoming the present difficulty and thus avoid the necessity of incurring extra expenditure in buildings. All our factories are working at a disadvantage owing to the comparative shortage of supplies, and if a district is in a position to muster sufficient pigs to warrant buyers regularly calling, it is certain that the existing factories would gladly co-operate in relieving the strain. At any rate, it would not pay to consider the erection of a factory to treat 200 pigs per month or less. If the number were 2,000 it would be an entirely different proposition. The inquirer is strongly recommended to give serious consideration to the proposal before moving any further.

DOUBLE-WIDTH DOOR.

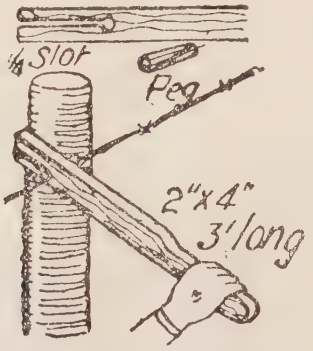
A wide door and a narrow one in the same wide opening, swinging in one direction, strongly barred and securely latched, are built as shown in the illustration taken from "Country Gentleman." The auxiliary button at the top may be



added to hold the primary door in closed position when it is not desired to open it. The hinges mounting the secondary door are spaced far apart, and the bar is of such a length and so positioned that hinges and bar will not interfere with each other in action. The long bar gives strength to the construction.

HOMEMADE BARBED-WIRE STRETCHER.

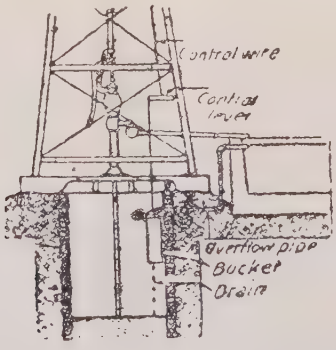
After trying various kinds of barbed-wire stretchers, none of which proved satisfactory, the stretcher shown in the illustration, which is from "Popular Mechanics," was constructed, and gave excellent results. It was made from a piece of 2 in. by 4 in. material, about 3 ft. long. One end was slightly rounded to serve as a handle, and a $\frac{5}{8}$ in. hole was drilled about 4 in. from the other end. A $\frac{1}{4}$ in. slot was then cut from the end to this hole to slip over the wire. After



the wire is located in the hole, as shown, a round tapered wooden peg is pushed in to keep it there. Then, using the post as a fulcrum, the wire is pulled tight by drawing the stretcher up against one of the barbs. The peg should project far enough on each side of the hole, so that it can readily be driven in or out with a slight tap of the hammer.

WINDMILL REGULATOR.

Many devices have been applied to windmill-driven pumps supplying water to tanks to regulate automatically the operation of the windmill as the water in the tank becomes too high or too low. Most of these arrangements are operated by a float or other device in the tank, and are easily rendered inoperative if the float leaks or the mechanism rusts.



The arrangement shown in the accompanying sketch suffers from none of the shortcomings of floats. A 5-gallon cream can is suspended in the well from the end of the control lever by means of a strong wire. A small hole in the bottom of the bucket allows the water to drip out, so that it is emptied about every three hours. As the weight is released, the pump clutch is automatically thrown in, and water is pumped into the tank until it reaches the level of the overflow pipe, which drains into the bucket; as the bucket is filled with water the pump is automatically disengaged, so that the container is prevented from overflowing.—"Farmers' Advocate," South Africa.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

As the regular wet season is expected to commence this month, provision should be made accordingly.

On coastal and intercoastal scrub districts, where recently burnt-off scrub lands are ready for the reception of seed of summer-growing grasses, sowing may commence as soon as suitable weather is experienced. Much disappointment may be saved, and subsequent expenditure obviated, by ensuring that only good germinable grass seed is sown, of kinds and in quantities to suit local conditions, the circumstance being kept in mind that a good stand of grass is the principal factor in keeping down weeds and undergrowth.

In all districts where wheat, barley, oats, canary seed, and similar crops have recently been harvested, the practice of breaking up the surface soil on the cropped areas should invariably be adopted. Soil put into fit condition in this way will "trap" moisture and admit of the rains percolating into the subsoil, where the moisture necessary for the production of a succeeding crop can be held, provided attention is given to the maintenance of a surface mulch, and to the removal, by regular cultivation, of volunteer growths of all kinds. If not already seen to, all harvesting machinery should be put under cover, overhauled, and the woodwork painted where required.

Where maize and all summer-growing "hoed" crops are not too far advanced for the purpose, they should be kept in a well-cultivated condition with the horse hoe. Young maize and sorghum crops will derive much benefit by harrowing them, in the same direction as the rows are running, using light lever harrows with the tynes set back at an angle to obviate dragging out of plants, but the work should not be done in the heat of the day.

Quick-maturing varieties of maize and sorghum may still be sown in the early part of the month in coastal areas where early frosts are not expected.

Succession sowings may be made of a number of quick-growing summer fodder crops—Sudan grass, Japanese and French millet, white panicum, and liberty millet (panicum). In favourable situations, both "grain" and "saccharine" sorghums may still be sown; also maize, for fodder purposes.

Fodder conservation should be the aim of everyone who derives a living from stock, particularly the dairyman; the present is an important period to plan cropping arrangements. Exclusive of the main crops for feeding-off (when fodder is suitable for this purpose), ample provision should be made for ensilage crops to be conserved in silo or stack. As natural and summer-growing artificial grasses may be expected to lose some of their succulence in autumn, and more of it in winter and early spring, the cropping "lay-out" to provide a continuity of succulent green fodder throughout the season calls for thorough and deep cultivation and the building up of the fertility and moisture-holding capacity of the soil. Planter's friend (sorghum) may be sown as a broadcast crop at the latter end of the month for cutting and feeding to cattle in the autumn and early winter. Strips of land should be prepared also for a succession sowing about the second week in February, and for winter-growing fodder crops.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as

this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle, lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Keep a sharp lookout for slugs and caterpillars.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed-boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight.

Orchard Notes for January.

THE COASTAL DISTRICTS.

All orchards, plantations, and vineyards should be kept well cultivated and free from weed growth; in the first place, to conserve the moisture in the soil, so necessary for the proper development of all fruit trees and vines; and, secondly, to have any weed growth well in hand before the regular wet season commences. This advice is especially applicable to citrus orchards, which frequently suffer from lack of moisture at this period of the year if the weather is at all dry, and the young crop of fruit on the trees is injured to a greater or less extent in consequence.

Pineapple plantations must also be kept well worked and free from weeds, as when the harvesting of the main summer crop takes place later on, there is little time to devote to cultivation. If this important work has been neglected, not only does the actual crop of fruit on the plants suffer, but the plants themselves receive a setback.

Banana plantations should be kept well worked, and where the soil is likely to wash badly, or there is a deficiency of humus, a green crop for manuring may be planted. Should the normal wet season set in, it will then soon cover the ground without injury to the banana plants. When necessary, banana plantations should be manured now, using a complete manure rich in potash and nitrogen. Pineapples may also be manured, using a composition rich in potash and nitrogen, but containing no acid phosphate (superphosphate) and only a small percentage of bone meal, ground phosphatic rock, or other material containing phosphoric acid in a slowly available form.

Bananas and pineapples may still be planted, though it is somewhat late for the former in the more southern parts of the State. Keep a good lookout for pests of all kinds, such as Maori on citrus trees, scale insects of all kinds, all leaf-eating insects, borers, and fungus pests generally, using the remedies recommended in Departmental publications.

Fruit fly should receive special attention, and on no account should infested fruit of any kind be allowed to lie about on the ground to become the means of breeding this serious pest. If this is neglected, when the main mango crop in the South and the early ripening citrus fruits are ready, there will be an army of flies waiting to destroy them.

Be very careful in the handling and marketing of all kinds of fruit, as it soon spoils in hot weather, even when given the most careful treatment. Further, as during January there is generally more or less of a glut of fresh fruit, only the best will meet with a ready sale at a satisfactory price.

Grapes are in full season, both in the Brisbane and Coominya districts, and in order that they may be sold to advantage they must be very carefully handled, graded, and packed, as their value depends very much on the condition in which they reach the market and open up for sale. Well-coloured fruit, with the bloom on and without a blemish, always sells well, whereas badly coloured, immature, or bruised fruit is hard to quit.

One of the greatest mistakes in marketing grapes is to send the fruit to market before it is properly ripe, and there is no better way to spoil its sale than to try and force it on the general public when it is sour and unfit to eat.

Bananas for sending to the Southern States require to be cut on the green side, but not when they are so immature as to be only partially filled. The frut must be well filled but show no sign of ripening; it must be carefully graded and packed and the cases marked in accordance with the regulations under the Fruit Cases Acts and forwarded to its destination with as little delay as possible.

Pineapples should be packed when they are fully developed, which means that they contain sufficient sugar to enable the fruit to mature properly. Immature fruit must not be marketed, and if an attempt is made to do so the fruit is liable to seizure and the sender of the fruit to prosecution under the abovenamed regulations. Further, the fruit must be graded to size and the number of fruit contained in a case must be marked thereon. Immature fruit must not be sent. For canning, the fruit should be partly coloured; immature fruit is useless; and overripe fruit is just as bad. The former is deficient in colour and flavour and the latter is "winey" and of poor texture, so that it will not stand the necessary preparation and cooking.

Should there be a glut of bananas, growers are advised to try and convert any thoroughly ripe fruit into banana figs.

The fruit must be thoroughly ripe, so that it will peel easily, and it should be laid in a single layer on wooden trays and placed in the sun to dry. If the weather is settled, there is little trouble, but if there is any sign of rain the trays must be stacked till the weather is again fine, and the top of the stack protected from the rain. To facilitate drying, the fruit may be cut in half lengthways. It should be dried till a small portion rubbed between the finger and thumb shows no sign of moisture. It can be placed in a suitable box to sweat for a few days, after which it can be dipped in boiling water to destroy any moth or insect eggs that may have been laid on it during the process of drying and sweating. It is then placed in the sun to dry off any moisture, and when quite dry it should be at once packed into tight boxes lined with clean white paper. It must be firmly packed, when, if it has been properly dried, it will keep a considerable time. It can be used in many ways, and forms an excellent substitute for raisins, sultanas, currants, or other dried fruits used in making fruit cakes and other comestibles. Banana figs will be found useful for home consumption, and it is possible that a trade may be built up that will absorb a quantity of fruit that would otherwise go to waste.

GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Granite Belt, and orchardists are fully occupied gathering, packing, and marketing the crop of midseason fruits, consisting of plums of several kinds, peaches, nectarines, pears, and apples. The majority of these fruits are better keepers and carriers than those that ripen earlier in the season; at the same time, the period of usefulness of any particular fruit is very limited, and it must be marketed and disposed of with as little delay as possible.

The advice given in the Notes for December, to send nothing but first-class fruit to market, still holds good. With the great increase in production, owing to the large area of new orchards coming into bearing and the increasing yields of those orchards that have not come into full profit, there is not likely to be any market for immature or inferior fruit. There will be ample good fruit to fully supply the markets that are available and accessible. Much of the fruit will not carry much beyond the metropolitan market, but firm-fleshed plums, clingstone peaches, and good, firm apples should stand the journey to the Central, and, if they are very carefully selected, handled in a manner to prevent any bruising, and properly graded and packed, they should carry as far as Townsville. Growers must remember that, given a market fully supplied with fruit, only such fruit as reaches that market in first-class condition is likely to bring a price that will pay them; consequently the grower who takes the trouble to send nothing but perfect fruit, to grade it for size and colour, to pack it carefully and honestly, placing only one sized fruit, of even quantity and even colour, in a case and packing it so that it will carry without bruising, and, when opened up for sale, will show off to the best advantage, is pretty certain of making good. On the other hand, the careless grower who sends inferior, badly graded, or badly packed fruit is very likely to find, when the returns for the sale of his fruit are to hand, that after paying expenses there is little, if anything left. The expense of marketing the fruit is practically the same in both cases.

Then "why spoil the ship for the ha'p'orth of tar" after you have gone to the expense of pruning, spraying, manuring, and cultivating your orchard? Why not try and get a maximum return for your labour by marketing your fruit properly? The packing of all kinds of fruit is a fairly simple matter, provided you will remember—

(1) That the fruit must be fully developed, but yet quite firm when gathered.

(2) That it must be handled like eggs, as a bruised fruit is a spoilt fruit, and, when packed with sound fruit, spoils them also.

(3) That only one-sized fruit, of an even degree of ripeness and colour, must be packed in a case.

(4) That the fruit must be so packed that it will not shift, for if it is loosely packed it will be so bruised when it reaches its destination that it will be of little value. At the same time, it must not be packed so tightly as to crush the fruit.

If these simple rules are borne in mind, growers will find that much of the blame they frequently attribute to the fruit merchants or middlemen is actually the result of their own lack of care. Fruit that opens up in the pink of condition sells itself, whereas any fruit that opens up indifferently is hard to sell on any except a bare market, and on a glutted market is either unsaleable or realises such a poor price that the grower is frequently out of pocket and would have been better off had he not attempted to market it.

If spraying with arsenate of lead, and systematic bandaging, has been properly carried out, there will be comparatively few codlin months to destroy the later ripening pip fruits; but if these essential operations have been neglected or carelessly carried out, a number of moths will hatch out and the eggs laid by them will turn to larvæ that will do much damage, in some cases even more than that caused by the first broods that attack the fruit as soon as it is formed. Where there is any likelihood, therefore, of a late crop of moths, spraying with arsenate of lead must be continued if the late crop of pip fruits is to be kept free from this serious pest.

Fruit fly must be systematically fought, and on no account must any fly-infected fruit be allowed to lie about on the ground and breed this pest, to do further damage to the later ripening fruits.

Citrus orchards will need to be kept well cultivated in the drier and warmer parts of the State, and, where necessary, the trees should be irrigated. If scale insects are present, the trees should be either sprayed, or, better still, treated with hydrocyanic acid gas.

Western grapes are in full season, and if they are to be sent long distances by rail, then they are all the better to be cut some hours before they are packed, as this tends to wilt the stems and keep the berries from falling off in transit. The fruit must be perfectly dry when packed, and should be as cool as possible. It must be firmly packed, as a slack-packed case always carries badly and the fruit opens up in a more or less bruised condition.